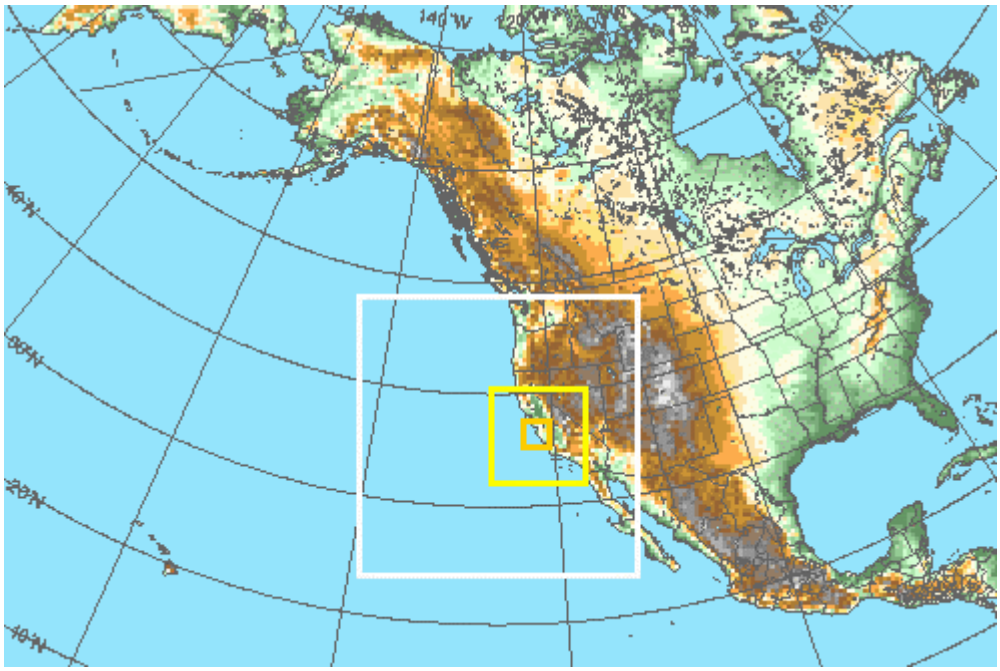
Coupled Ocean/Atmosphere Mesoscale Prediction System - On-Scene (COAMPS-OS) User Manual

Version 1.3



Prepared by

Sarah Bargsten
Computer Sciences Corporation
Monterey, CA

Lari Migues McDermid
Neptune Sciences Incorporated
Slidell, LA

Daniel Geiszler
Science Applications International Corporation
Monterey, CA

John Cook
Naval Research Laboratory Marine Meteorology Division
Monterey, CA

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HOW THIS MANUAL IS ORGANIZED

This manual demonstrates how to use COAMPS-OS. The manual is divided into three main sections:

1. Introduction: includes an overview of the COAMPS-OS system and descriptions of mouse and keyboard input with COAMPS-OS GUI, window navigation, and other basic operational topics.

2. "How Do I?": includes step-by-step procedures of common tasks involved in running COAMPS-OS.

3. COAMPS-OS GUI: includes a detailed description of each COAMPS-OS GUI feature with associated options and usage.

PART 1 – INTRODUCTION

The Coupled Ocean/Atmosphere Mesoscale Prediction System - On-Scene (COAMPS-OS) is an automated, portable weather prediction system. COAMPS-OS allows the forward deployed user to use the growing volume of perishable atmospheric data available on-scene by using either large-scale model or mesoscale model gridded data fields as a first guess and augmenting those data fields with observations, satellite data, etc. Currently, the data formats supported by COAMPS-OS are the World Meteorological Organization (WMO) standard Gridded Binary (GRIB) and Binary Universal Format (BUFR) formats. The core of COAMPS-OS is the atmospheric component of the non-hydrostatic Coupled Ocean/Atmosphere Mesoscale Prediction System (COAMPS) developed at the Naval Research Laboratory (NRL) and run operationally at the Fleet Numerical Meteorology and Oceanography Center (FNMOC). The COAMPS-OS graphical user interface (GUI) allows the operator to configure weather forecasts for areas of tactical interest and set up customized output data sets. A COAMPS-OS run might be setup to generate surface wind forecasts every 30 minutes, for example.

COAMPS-OS requires the following hardware at the installation site:

- **COAMPS-OS Computational Server** - Multiprocessor UNIX computer.
- **Tactical Environmental Data Server (TEDS)** - Common Operating Environment (COE) compliant computer supporting the TEDS MAGRID, MALLT, and MAREM Application Programming Interfaces (API's).
- **Webserver**
- **Graphics Workstation**
- **Uninterrupted Power Supply (UPS) Power Protection**
- **Ethernet Switch**

Network connectivity is required primarily for transferring fields from the Navy Operational Global Atmospheric Prediction System (NOGAPS) at FNMOC in Monterey, CA to local COAMPS-OS. NOGAPS provides the lateral boundary conditions and initial background fields for COAMPS. The NOGAPS fields are transmitted by FNMOC in the WMO standard GRIB format. The GRIB format files are decoded and then populate the TEDS database. The TEDS computer also contains a set of API's used to extract data out of the Informix database. In addition to decoding the NOGAPS fields, the TEDS component of COAMPS-OS can also automatically decode, store, and perform quality control on observational data from both serial and network data feeds. Normally, the serial port on the Sun server is connected to an output port on the CONTEL Meteorological Workstation (CMW). In a subsequent release of COAMPS-OS, the data connection will be migrated to a network connection from the unclassified Meteorological Information Standard Terminal (MIST), which is a component of the Meteorological Integrated Data Display System (MIDDS).

The output data field products from COAMPS are designed to support tactical operational interests. The resultant meteorological and oceanographic analyses and

forecasts (such as visibility and refractivity) are intended for use in decision-making and mission support. The output data are stored in TEDS by application software that uses the TEDS API's.

As shown schematically in Figure 1, the core capability of COAMPS-OS supports independent storage of local observations, satellite-derived observations, and boundary conditions from a central or regional center to maintain an on-site data assimilation capability. COAMPS-OS includes automated quality control (QC) software for atmospheric and oceanographic data, a Multi-Variate Optimum Interpolation (MVOI) atmospheric analysis, the COAMPS Ocean Data Assimilation (CODA) System, and the COAMPS forecast model. COAMPS has the ability to calculate derived sensible weather parameters from the basic atmospheric state variables to support Meteorology and Oceanography (METOC) Decision Aids (MDA) and Tactical Decision Aids (TDA). The channel between the environmental and tactical communities is provided by the Navy Integrated Tactical Environmental Subsystem (NITES), which manages and distributes data through the TEDS database.

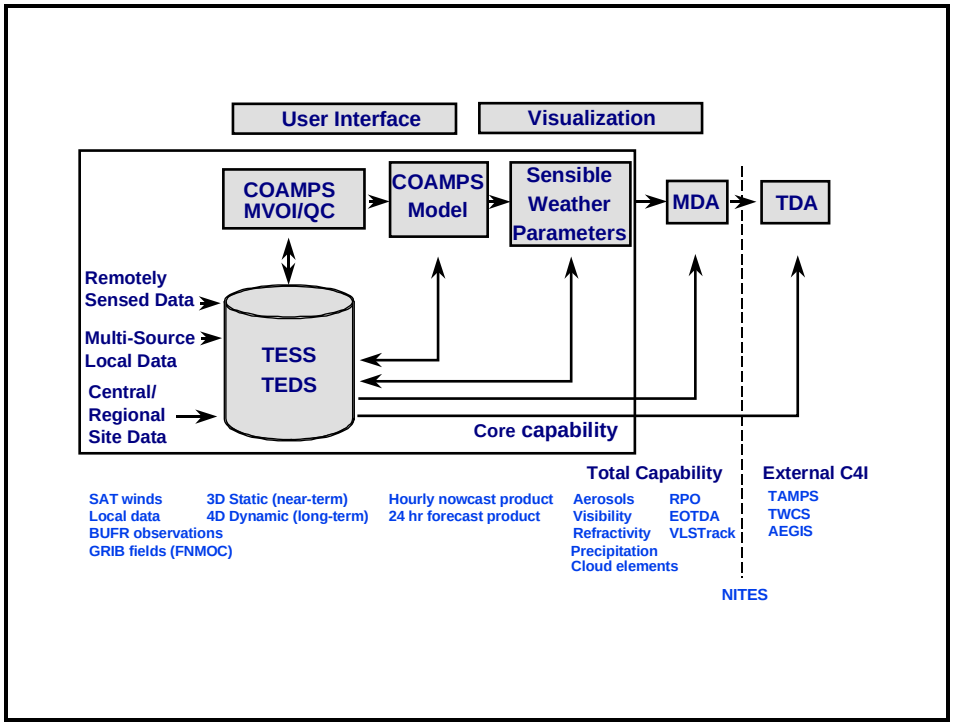


Figure 1. Schematic diagram of COAMPS-OS components and internal data flow

In mesoscale data assimilation scheme, a previous model forecast is used as the starting point. Observed data is incorporated in the analysis, which is then used to initialize the next model forecast. This process is typically repeated every 12 hours. However, this cycle is used to regularly update only the local model forecast field using the analysis (without a subsequent forecast). The result is called a COAMPS-OS "Nowcast". The purpose of the Nowcast feature is to automatically maintain a database containing the best estimate of the current environmental conditions within the local domain.

Thus, COAMPS-OS adds value to the model output from FNMOC and other modeling centers by running a fine-mesh, tactical-scale model that incorporates additional data from observations. In addition to producing high-resolution forecasts, COAMPS-OS allows mission planners and operators access to fine-scale data for use by various planning and decision aid applications.

REFERENCES

March 2002	COAMPS-OS System Administrator's Manual, NRL
March 2002	COAMPS-OS Installation Procedures, NRL
March 2002	COAMPS-OS Software Test Document, NRL
	COAMPS User's Manual, NRL

MOUSE BASICS

The mouse is used to move the cursor around the computer screen, make selections, and perform other actions. Figure 2 illustrates the features of a 3-button mouse.

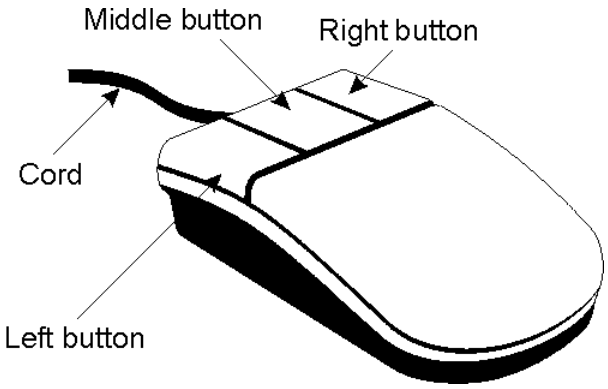


Figure 2. The Mouse

The mouse has a sensor on the underside that responds when the mouse is pushed across a surface. As the sensor responds, a signal is sent to the computer, which moves the cursor on the screen as the mouse is moved. Pressing one of the mouse buttons also sends a signal to the computer, which records the position of the cursor when the button was pressed and which button was pressed. Some basic mouse operations are listed below.

Click By convention, a **click** is a quick press and release of the left mouse button.

Right-Click A quick press and release of the right mouse button.

Double-Click Pressing and releasing the left mouse button twice in rapid succession.

Drag To drag an object, position the cursor over the object, press and hold the specified mouse button (usually the left one unless otherwise specified), and move the mouse. When dragging of the object is complete, release the mouse button. This technique is used to move objects around on the screen.

Resize To resize an object, position the cursor over the object, press and hold the specified mouse button (usually the left one unless otherwise specified), and move the mouse. When resizing of the object is complete, release the mouse button.

Within the COAMPS-OS GUI, the mouse middle and left mouse buttons perform the same functions and the right mouse button is inoperable. Therefore, all mouse functions can be completed by using only the left mouse button.

KEYBOARD BASICS

In addition to a mouse, a keyboard may also be used to navigate through many of the COAMPS-OS functions.

Use the **TAB** key to move forward between fields and/or buttons.

SHIFT-TAB moves the cursor in a reverse direction between fields and/or buttons (usually backwards or up to the previous field or button).

When a button is highlighted on the screen, pressing the **ENTER** or **RETURN** key performs the action indicated for that button.

WINDOW AND NAVIGATION BASICS

This section describes the parts of the COAMPS-OS GUI window within the browser. Since the GUI is continually being improved, this section will be general. Details will be included as the GUI design is finalized.

The main COAMPS-OS GUI window is divided into two parts: the **Main Control Panel** and the **Map Panel**. Section 2 “How Do I?” provides descriptions of each GUI item shown in Figure 3.

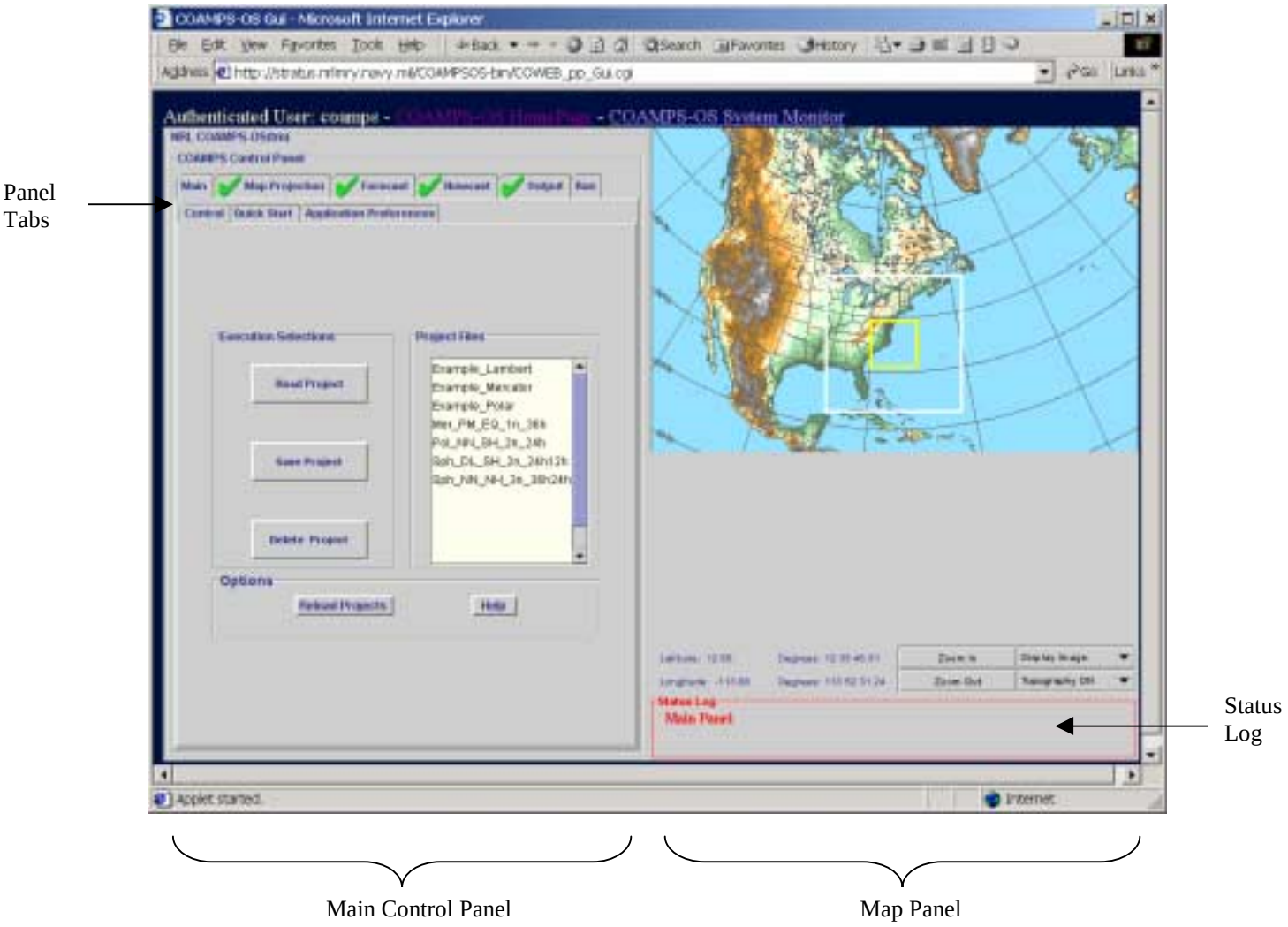


Figure 3. Parts of the COAMPS-OS GUI Window

PART 2 – HOW DO I?

This section includes step-by-step instructions for performing common tasks using the COAMPS-OS GUI.

HOW DO I LOG IN FOR TRAINING?

The COAMPS-OS GUI is accessible from an Internet browser such as Netscape or Internet Explorer. The web browser must have the Java Plug version 1.2 or higher. Enter the URL of the COAMPS-OS homepage into the browser Address (or Location) field to open the COAMPS-OS GUI. Figure 4 depicts a sample view of the COAMPS-OS homepage. In this example, the COAMPS-OS homepage URL is "http://stratus.nrlmry.navy.mil".

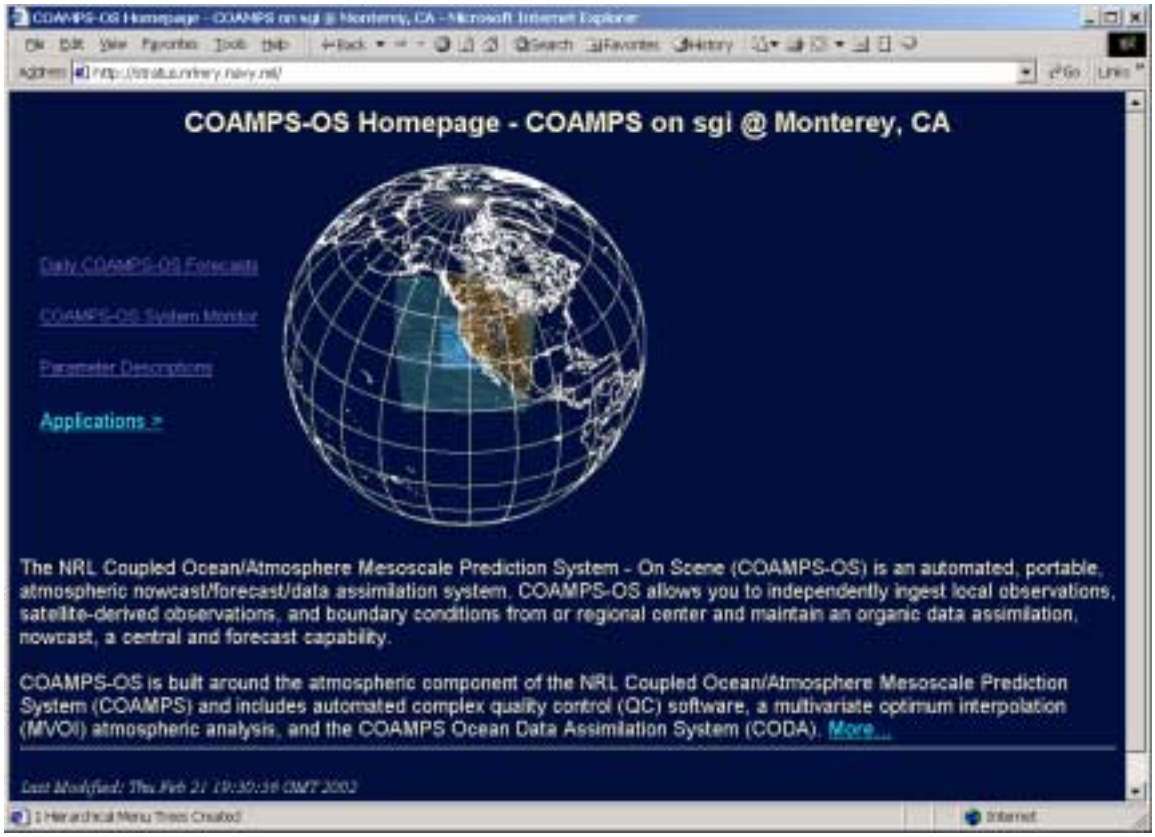


Figure 4. Accessing the COAMPS-OS homepage.

From the COAMPS-OS homepage, move the cursor over the text "Applications >" listed on the left side of the page. A blue drop-down menu will appear (Figure 5) as the cursor is moved over the text; it will disappear as the cursor is moved off. The drop-down menu contains a list of applications available from the COAMPS-OS homepage. As the mouse cursor is over the "Applications >" text, move the mouse cursor over the text "COAMPS-OS GUI". Click the mouse button to make the selection.

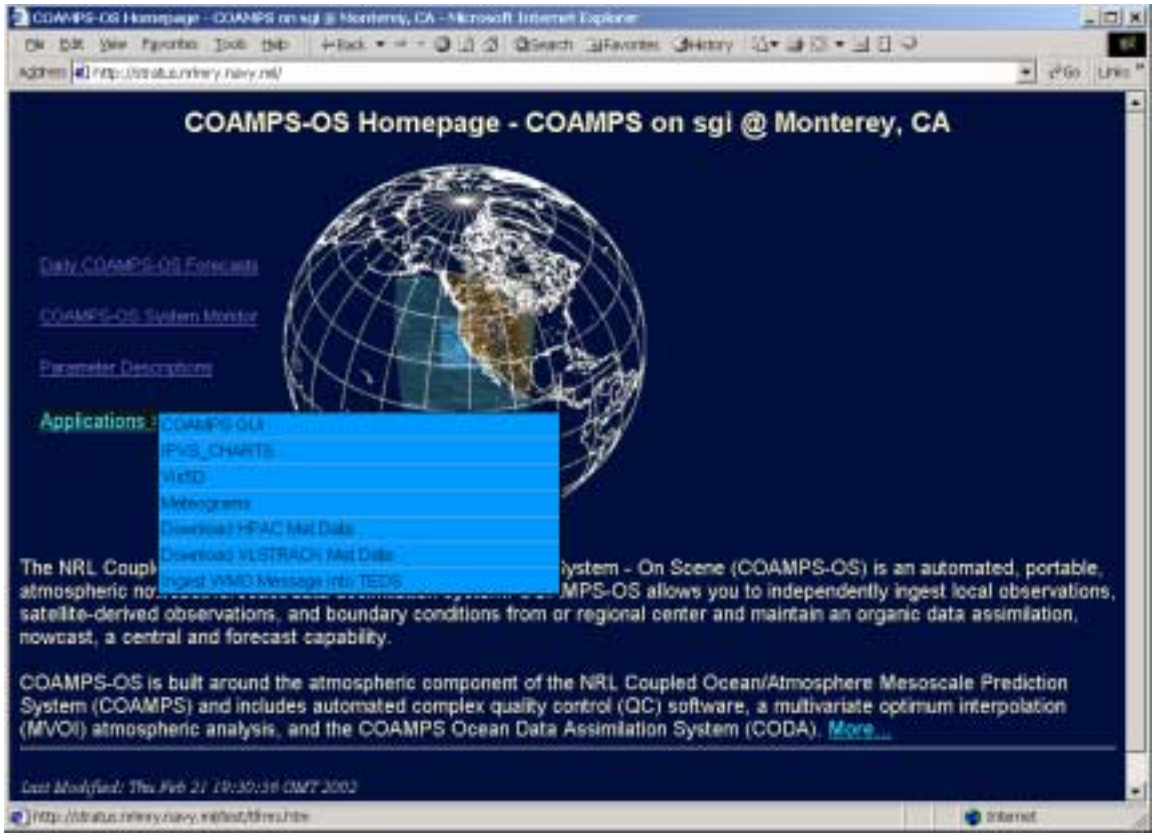


Figure 5. COAMPS-OS Applications Drop-Down Menu

The web browser will display a dialog requesting a **User ID** and **Password** the first time that the COAMPS-OS GUI is accessed. The **User ID**, once authenticated with a valid password, will be valid for the remainder of the session. Closing and restarting the web browser will clear the **User ID** and **Password**.

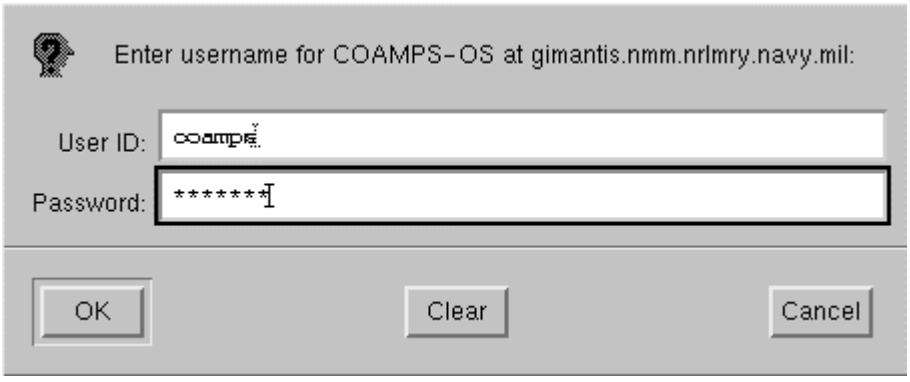


Figure 6. User authentication in COAMPS-OS

To log in as the "coamps" user, type "coamps" (all lower case and no quotes) in the **User ID** field in the dialog window. Type the password into the **Password** field. The password may be recorded below.

User ID: coamps

Password: _____

NOTE ON PASSWORDS: The password should be changed every six months. To change the password, consult the COAMPS-OS System Administration Manual section describing configuration of the webserver. Choose passwords with eight characters, containing a mix of alphanumeric and non-alphanumeric characters. (Do not use reserved UNIX symbols @, *, /, or ?.) Be aware that passwords in web browsers are case-sensitive. Although a user identification and password are required to access the COAMPS-OS interface, they may not be valid to login into the system from a console. The user identification and password are recognized only by the webserver software, not the systems running the software.

Upon successfully logging into the COAMPS-OS GUI, the web browser will load the COAMPS-OS GUI application. The loading screen will appear similar to Figure 7.

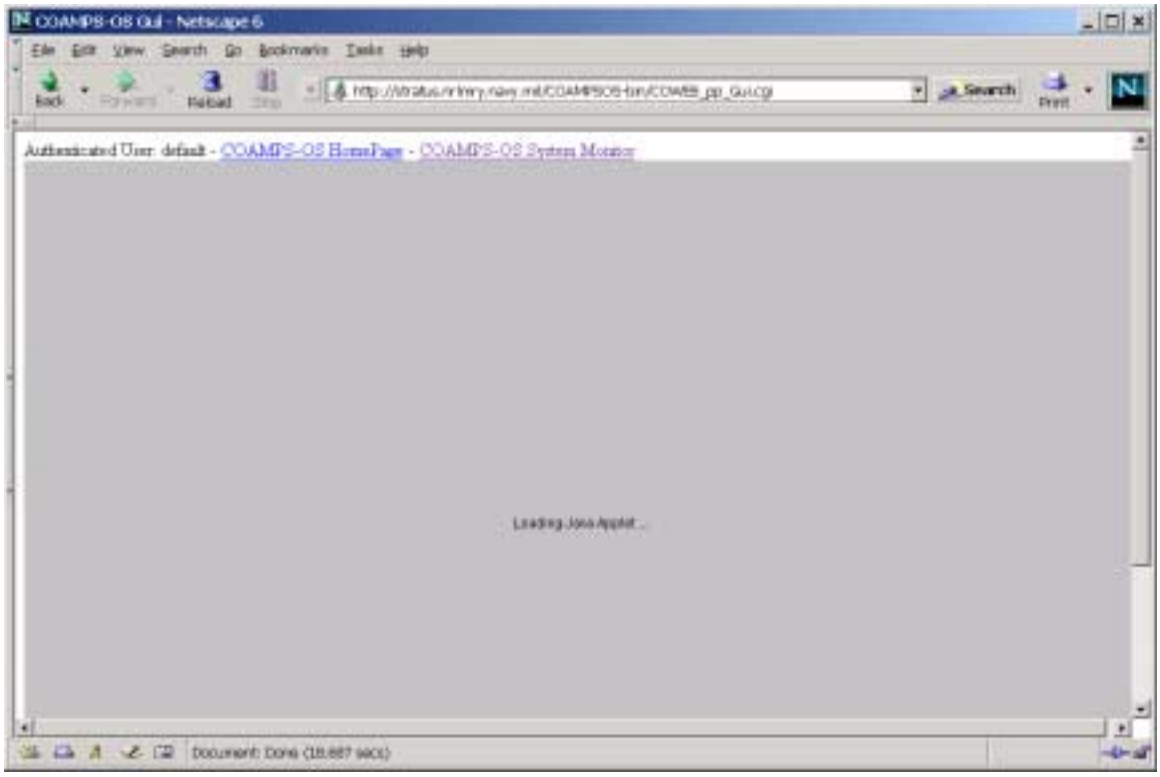


Figure 7. Loading the COAMPS-OS Application in the web browser.

After the COAMPS-OS GUI has loaded, an interface will appear with multiple configuration tabs in the left panel and an image of the world in the right panel (Figure 3). Proceed to the "HOW DO I SET UP A COAMPS RUN?" section to configure a COAMPS simulation.

HOW DO I LOG OUT?

There is no formal logout procedure. An implicit logout is performed when the user closes the web browser; the web browser must be closed in order to log out. Currently, the only way to change to a different user identity is to close the web browser and then restart the web browser.

HOW DO I USE QUICK START TO SET UP A COAMPS RUN?

The **Quick Start Control Panel** allows the user to quickly setup a COAMPS model run with minimal input. The user is required to input a center position and a project name to be saved. The project will use all the default values for the model run (Table 1-1).

- **Mesh 1 Center Latitude** specifies the center latitude of the mesh 1.

  The **North/South** Button to the right of the entry box specifies the hemisphere of the center Latitude.

  Mesh 1 Center Latitude is a *required* value.

  Keyboard Input is accepted by typing in a value for the center latitude.

  Mouse Input is accepted by clicking the left mouse button on the desired position of interest. The mouse feature will automatically update the center latitude and the center longitude.

- **Mesh 1 Center Longitude** specifies the center longitude of the mesh 1.

  The East/West Button to the left of the entry box specifies the hemisphere of the center longitude.

  Mesh 1 Center Longitude is a *required* value.

  Keyboard Input is accepted by typing in a value for the center longitude.

  Mouse Input is accepted by clicking the left mouse button on the desired position of interest. The mouse feature will automatically update the center latitude and the center longitude.

- **Project Name** allows the user to specify a name for the project.

- **Run COAMPS** allows the user to quickly save a project and set up batch mode execution of COAMPS.

  1. Verify the name of the project prior to the project information being saved.

2. The project will be saved.

3. Set up batch times for the model execution in the **Batch Panel**.

COAMPS Model Input Parameters	Default Setting
Projection Type	Defined by position of center latitude and longitude input by the user
Standard Latitude 1	22.5° Mercator 60° for Lambert Conic and Polar Stereographic Not used for other projection types
Standard Latitude 2	30° for Lambert Conic Not used for other projection types
Number of Meshes	2
Grid Size	61x61
Grid Spacing	0.40 Degrees for Spherical 45 km for all other projections
Auto Centered	ON
Length of Forecast Start Time	00 Hours
Length of Forecast Stop Time	24 Hours
Data Assimilation Interval	12 Hours
Frequency of Sigma Output	1 Hour
Analysis of Mesh 1	True
Analysis of Inner Meshes	True
Nowcast Option	No
Output Parameters	Set to values in the default file

Table 1-1. Default settings for Quick Start option

HOW DO I SET UP A COAMPS RUN?

Upon initialization of the COAMPS-OS GUI, the **Main Control Panel** is opened by default. The **Map Projection Location** and **Positioning** control panels interact with the **Map Panel**. Actions on the **Main Control Panel** are reflected in the **Map Panel**, and vice versa. The **Main Control Panel** options are accessible via tab selections. There is a logical progression through each tab as a COAMPS-OS project is being setup.

The **Main Control Panel**, shown in Figure 8, is designed to guide a user through the steps required to set up a COAMPS model run. The ✗ symbols indicate actions to perform, starting with the tab farthest to the left. Click the tab beside each ✗ to select project setting in the indicated panel. As each step is finished, the ✗ will turn to a ✓, indicating completion.

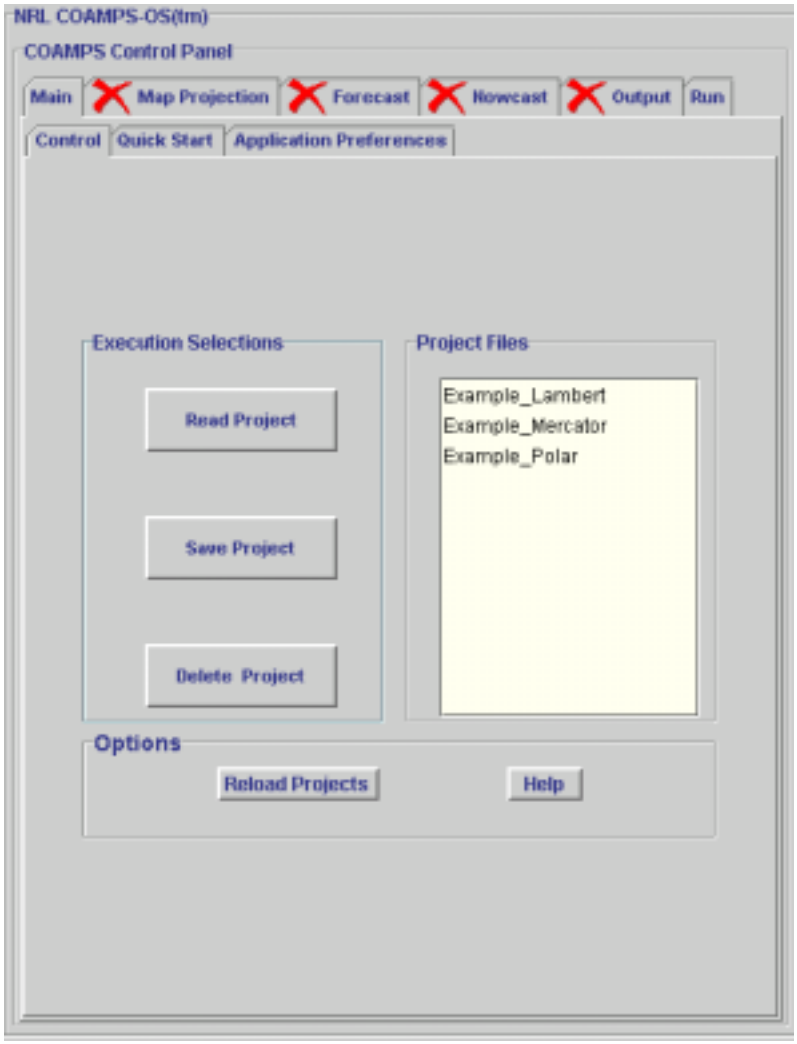


Figure 8. COAMPS-OS Main Control Panel

The steps to set up a COAMPS model run are:

1. **Select the Area of Interest.** The user selects the geographic area of interest for the model run.

2. **Set the Map Options.** The user defines the map projection, number of grids, grid spacing, location for each grid, and other attributes using the **Map Projection Control Panel**.

3. **Set the Forecast Options.** The **Forecast Control Panel** allows the user to select the forecasting intervals, three-dimensional output frequency, and data assimilation options.

4. **Set the Nowcasting Options.** The **Nowcast Control Panel** allows the user to select the start and end times for the COAMPS Nowcast, frequency of Nowcast during the

run, and time after each basetime to start the Nowcast run. The user may also set a time delay to allow for the receipt of observational data.

4. **Set the Output Data Options.** For each grid in the nest, the **Output Control Panel** allows the user to set the parameters that will be output during the forecast and the levels at which parameters will be output.

5. **Run the COAMPS Model.** After steps 1 through 5 are complete, the user selects the **Run** tab to start a COAMPS model execution and produce the specified outputs.

In the "How Do I" sections that follow, each of these steps will be discussed in more detail. Further detail of each COAMPS-OS GUI control panel is provided in Section 3.

HOW DO I SELECT AN AREA OF INTEREST?

The first step for setting up the project area is defining an area of interest. Select the desired location by single clicking the left mouse button in the map panel; this will be an approximate area. The latitude and longitude position of the cursor is displayed in decimal degrees, minutes, and seconds at the bottom of the **Map Panel** below the map. The position information provides the user with the actual navigational position as the mouse is moved across the map.

After the user clicks the mouse button while the cursor is over the desired location, a map is displayed in the **Map Panel** showing the selected area. The appropriate projection for the selected area is returned. The fields defining the grid size and spacing may be set in the **Map Projection Location** and **Positioning** panels. The projection of the map will automatically be set based upon the location of the area selected; the **Map Projection Location** and **Positioning** panels will be updated with information that reflects the projection. Colored boxes representing the forecast grids are initially drawn on the map, with the mouse position set as the center latitude and longitude for the meshes. The color of each box corresponds to the grid number indicated in the **Map Projection Positioning** panel.

If the user desires to view a smaller area of interest within any map shown in the **Map Panel** (except the global map), the user may use either the automatic center zoom option or the roping option.

The automatic center zoom will zoom into the center position of mesh 1 when the user clicks the **Zoom In** button. The user may continue to zoom into the center of the mesh.

The roping option allows the user to specifically define the area for zooming. The user may select an area within the map by clicking and holding down the left mouse button while dragging the mouse. A dotted red box highlighted with yellow stippling indicates the selected area as the user moves the mouse with the left button depressed. After releasing the left mouse button, the user may select the **Zoom In** button to obtain the new map.

HOW DO I SET THE MAP OPTIONS?

COAMPS uses a horizontally nested grid system – an outer, coarse grid with progressively finer grids inside. Each of the inner grids must be fully contained within the parent outer grid. COAMPS-OS allows forecasts a maximum of five levels of nested grids. This section shows the user how to set up the forecast grids in the **Map Projection Control Panel** (Figure 9).

Figure 9. Map Options Control Panel

NOTE: A powerful feature of COAMPS is the ability to let the high-resolution terrain interact with or influence the local atmospheric flows set up by the larger-scale synoptic situation. Thus, when setting up the grid map for each nest it is very important to include the primary topographic features that influence the local conditions within the grid. For best results, the topographic features should be enclosed within the grid and adequately resolved at the scale of the grid resolution chosen to run COAMPS.

In the COAMPS **Map Panel** display, a solid red bounding box represents the domain with available boundary fields. A fully enclosed map represents global boundary conditions, while a smaller red rectangle represents a regional subset of boundary conditions. The GUI will constrain all COAMPS forecast areas to be fully enclosed within the red bounding box. If no red boundary box is shown, the entire world is available for selection as shown in Figure 10.

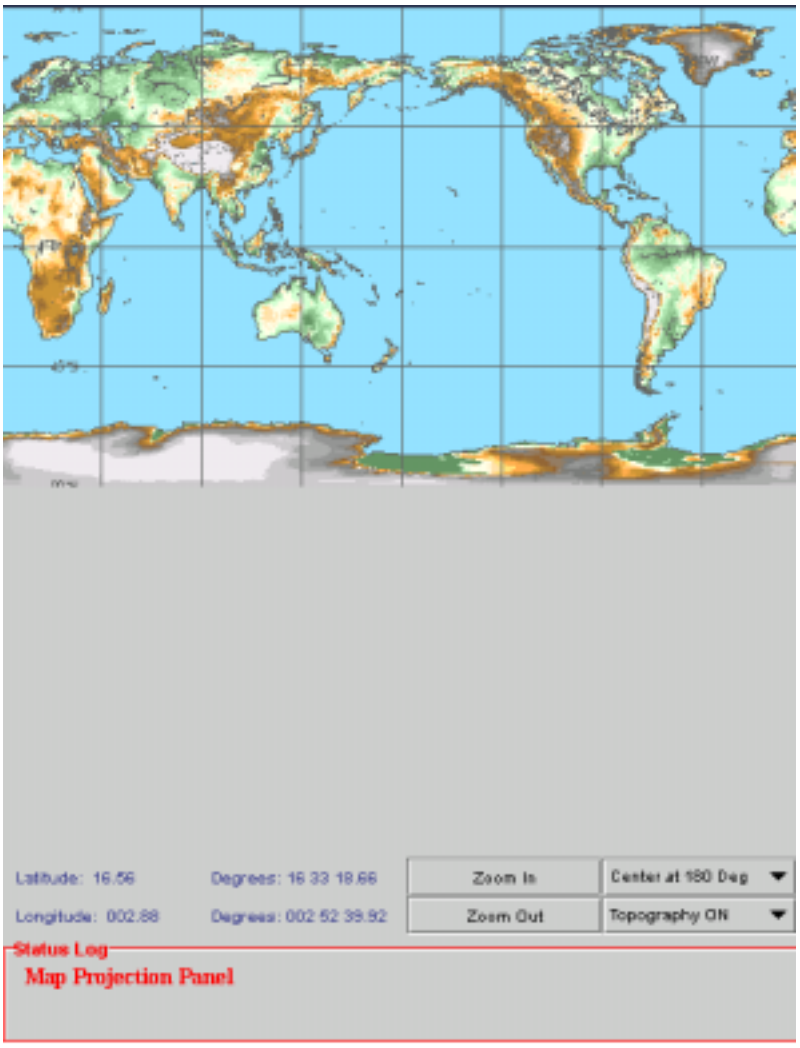


Figure 10. Example of the COAMPS-OS GUI Map Panel.

Open the **Map Projection Control Panel** (Figure 11) by clicking the **Map Projection** tab. The **Map Projection Control Panel** contains two tabs, the **Location** tab and the **Positioning** tab. The functionality of each panel is described in the sections that follow.

Map Projection Location Panel

At the top of the **Map Projection Location Panel** is a selection button for the map projection. Click on the selection button to obtain a menu of projections. The available options are Mercator, Lambert Conformal, Polar Stereographic, and Spherical. The

options specify the native projection for the COAMPS computational grid and define the projection of the COAMPS output. If the projection type is modified, the position of the meshes will be verified with the newly selected projection. If the center position and projection type are not compatible, the projection type will not be modified, and the user will be informed of the problem. If the center position and projection type are compatible, a new map will be obtained for the user in the **Map Panel**.

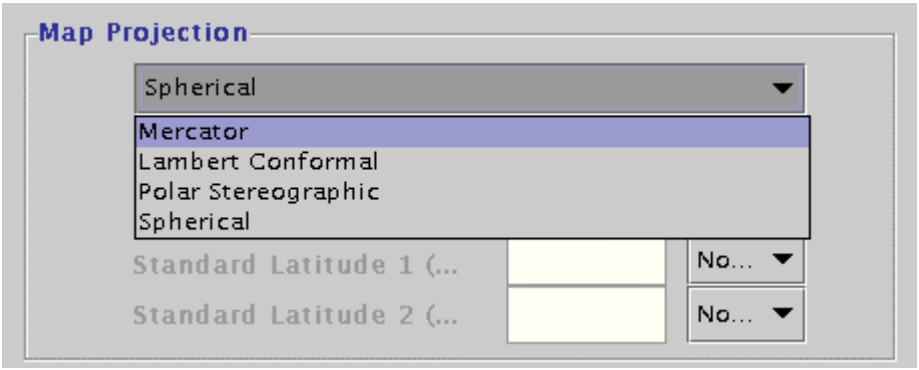


Figure 11. Projection selection menu.

Below the map projection selection area are fields for entering the center latitude and longitude of mesh 1 (the outer mesh; indicated by a white box), as well as selection buttons for entering the hemisphere values. The center position of the meshes may be modified by 1) single clicking a new location in the **Map Panel**, 2) dragging mesh 1 to the new location, or 3) typing the position into the latitude and longitude fields. Click on the hemisphere selection button located to the right of the longitude or latitude to modify the geographical context of the longitude (east or west) or latitude (north or south). If the center location has changed, the grids (colored boxes) in the **Map Panel** will change accordingly.

A projection may require a definition for one or two standard latitudes. Below the center latitude and longitude entries in the **Map Projection Location Panel**, are fields for entering a value for the standard latitude(s) of the projection. It is beyond the scope of this manual to provide an explanation of the role of the standard latitude in various map projections. A World Atlas or other mapping publications may be consulted to obtain more information describing the projections used in COAMPS. In most cases, the default values for the standard latitude(s) provided by the COAMPS-GUI will be adequate for a COAMPS forecast.

Additional features of the **Map Projection Location Panel** include the **Load File**, **Update Map**, and **Reset** buttons (Figure 12). The **Load File** button may be used to load a previously defined set of map options. Loading previously saved options may save time in defining the map options. The **Update Map** button allows a user to reload the **Map Panel** with the parameters defined in the **Map Projection Location Panel**. The **Reset** button resets all values to the default values defined at initialization.

Figure 12. Examples of the Load File, Update Map, and Reset buttons.

Map Projection Positioning Panel

The top of the **Map Projection Positioning Panel** contains a **Grid Section** (Figure 13) for setting the number of meshes, size, and spacing for each COAMPS grid. By default, two grids (mesh 1 and mesh 2) are available with grid sizes and spacing predetermined by the COAMPS-GUI. Add another grid by clicking the mesh label of the desired mesh. Turn off a mesh by clicking the mesh label preceding the mesh number to remove. For example, to increase the number of grids from 2 to 3, click the ORANGE mesh 3 label. Reduce the number of grids from 3 to 2 by clicking the YELLOW mesh 2 label.

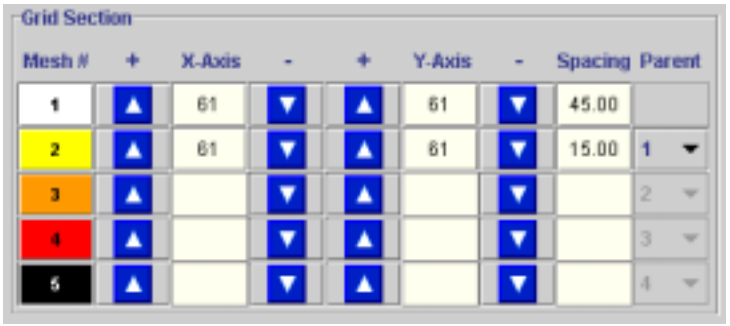


Figure 13. Grid Section

The **X-Axis** and **Y-Axis** entry boxes and increment/decrement arrows allow the user to set the number of grid points for each grid's x-axis (parallel to bottom edge of the map) and/or y-axis (parallel to the left edge of the map). The number of grid points must be a multiple of three plus one (31, 34, 37, etc.). The valid range of values for the x-axis and y-axis is between 31 and 151 grid points. Each user modification of the grid size is checked for validity and the user will be informed in the **Status Panel** if a value is invalid and needs to be corrected.

Users may modify the grid spacing by entering a value under the **Spacing** column. Grid spacing increments for the Mercator, Lambert Conic, and Polar Stereographic projections are in kilometers with valid values between 27 and 81 kilometers. The Spherical projection requires grid spacing increments in degrees with valid values between 0.2 and 1.0 degrees. Changes to the grid resolution of one grid automatically change the grid spacing values for the other grids. COAMPS grids increase in resolution by a factor of three with each inner mesh.

The **Parent** option on the right side of the **Grid Section** allows the user to specify the parent grid for each nested grid. The **Parent** option allows the user to have multiple grids of equivalent resolution within a single parent grid, as depicted in Figure 14. Change the parent of a grid by selecting the parent grid from the selection button.

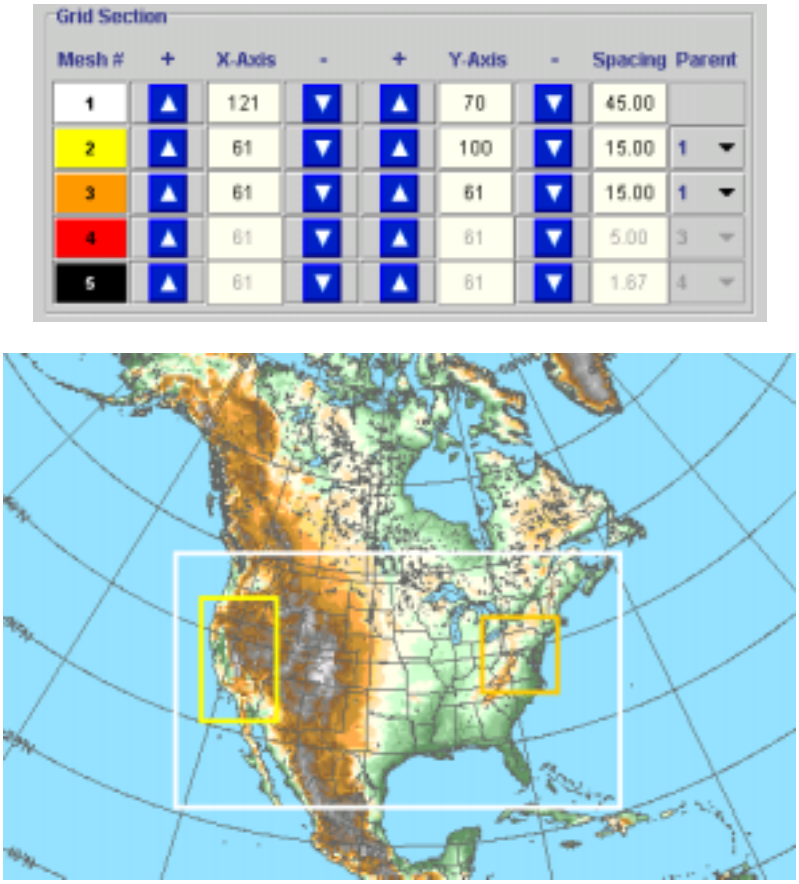


Figure 14. An example of two grids with a single parent. Colored boxes in the Map Panel correspond to the colors shown for each mesh number.

NOTE: Discretion should be used when altering the parameters in the **Grid Section**. In general, increasing the number of grids and/or increasing the size/resolution of each forecast grid will increase the length of time required to complete a forecast. A user is allowed to create a forecast domain so complex that COAMPS is unable to complete in real time. As well, the memory required to execute the forecast may exceed the amount of available physical memory for the system. Prior to executing the model, a feedback window will appear with an estimate of the amount of time required to complete the forecast. Using the estimated forecast time as a guide, a user may need to return to the control panel to reconfigure the domain in order to reduce the amount of required time to complete the forecast.

The **Mesh Positioning** section allows a user to incrementally move individual meshes one grid point in the desired direction. By default, the **Mesh Positioning Auto Center** option is **ON** for each inner mesh, so each inner grid is automatically centered within its respective parent grid. Change the **Disable Auto Center** option by clicking on the checkbox next to the grid to be moved. The checkbox will have a ✔ (checkmark) to indicate the auto centering option is now **OFF** for the selected grid, as shown in Figure 15. The directional arrow button allows the user to incrementally move the grids within the parent grid. The numbers shown in the white boxes between each directional arrow

button are reference points used internally by COAMPS. Use the directional arrow buttons to increase or decrease the values in each box. An inner grid is prevented from moving too close to the boundary of its respective outer grid; however, grids with the same parent may overlap.

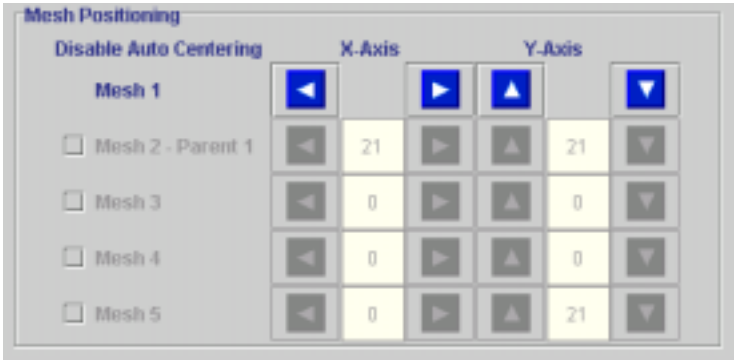


Figure 15. Mesh Positioning Panel

The mesh may be moved using one of three methods 1) using arrow keys, 2) typing in a value, or 3) user interaction within **Map Panel**.

1. **Arrow Keys**: To use the arrow keys, select the direction to move the mesh (**X** or **Y**). The arrow keys immediately update the mesh on the map, incorporating all appropriate boundary limitation checking.

2. **Input Value**: Type in a value by clicking within the field and type the value. Press **RETURN** or **ENTER** to update the map and initiate all boundary limitation checking.

3. **Interactive**: It is not necessary to open the **Positioning Panel** to interactively move a grid. The user may select the mesh to move within the **Map Panel**. By moving the cursor over the desired mesh until the cursor changes to a cross-hair symbol, and then depressing the left mouse button, the mesh can be moved to a different location. Values shown in the **Positioning Map Projection** panel are automatically updated, as the mesh is moved.

The **Map Projection Positioning Panel** has **Load File**, **Update Map** and **Reset** selection buttons. The **Load File** button may be used to load a previously defined set of map options. Using the load function may save time when defining the map options. The **Update Map** button will update the image shown in the **Map Panel** using the latest settings from the **Map Projection Panel**. The **Reset** button returns all values to those defined at initialization.

As the user proceeds to another control panel, the values of the **Map Projection Panel** will be checked for consistency within the selected projection. If the changes are consistent with the projection displayed in the **Map Projection Panel**, the ✗ next to **Map Projection** will turn to a ✓, as shown in Figure 16.

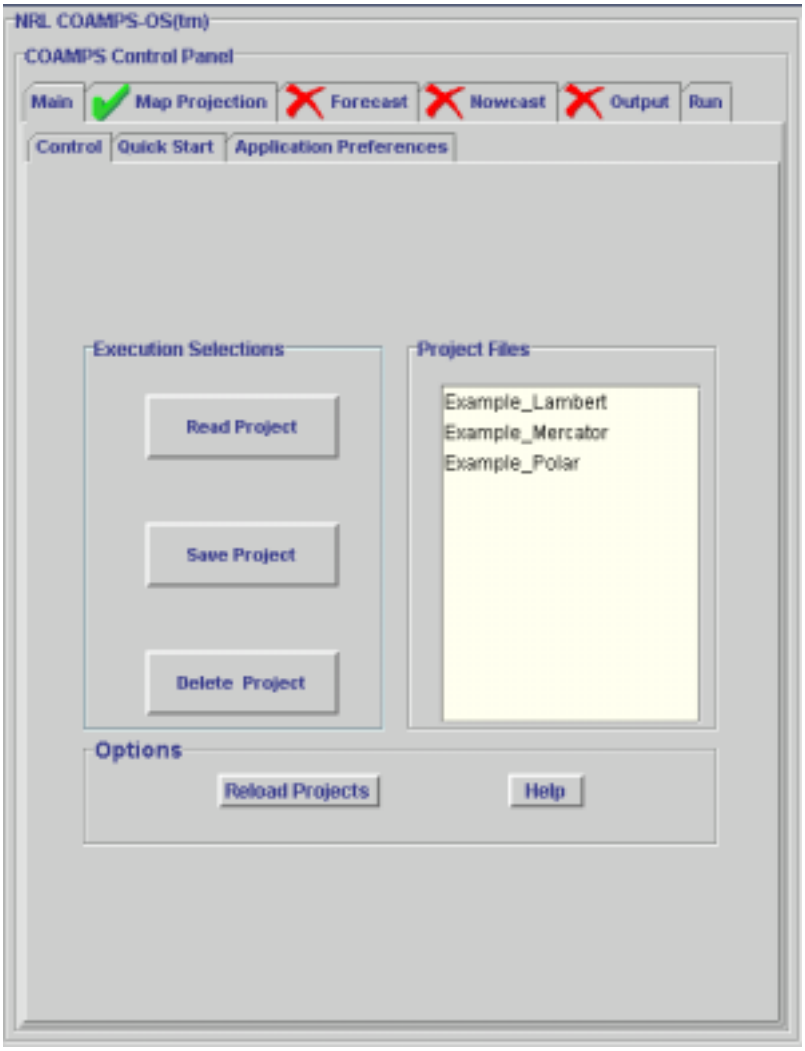


Figure 16. Main Control Panel after completing Map Options setup.

HOW DO I SET THE FORECAST OPTIONS?

Click on the **Forecast** tab to open the **Forecast Options Control Panel** shown in Figure 17.

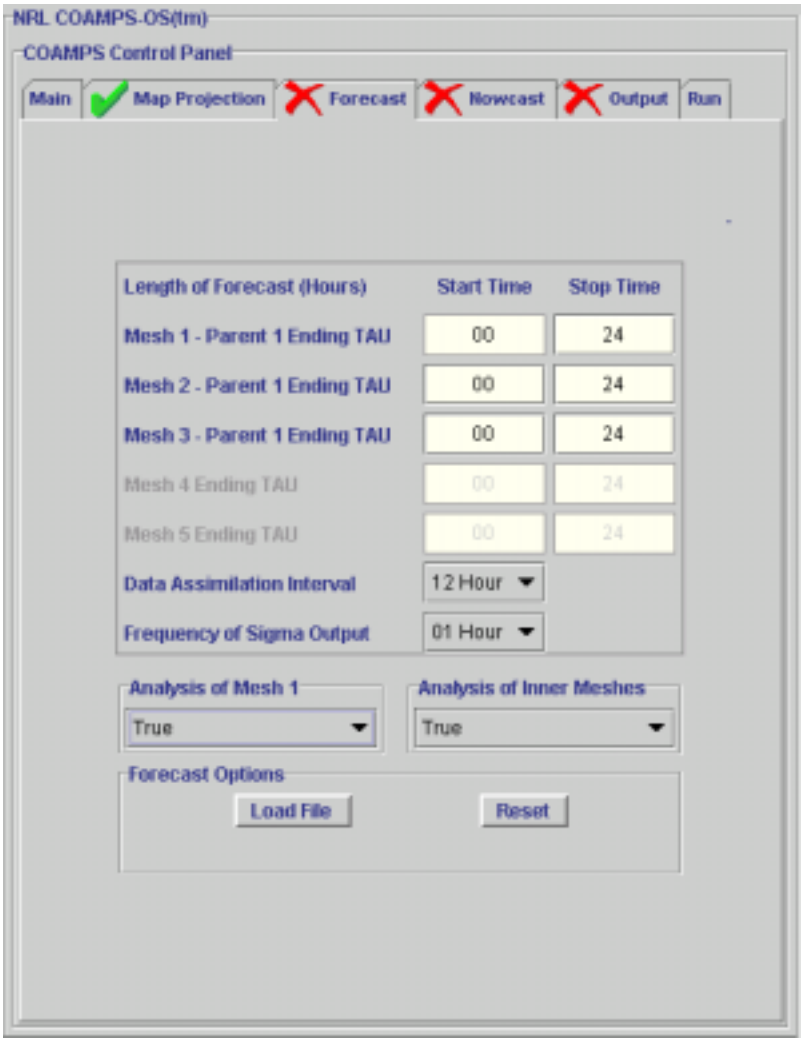


Figure 17. Forecast Options Control Panel

The **Forecast Options Control Panel** allows the user to set the duration of the forecast for each mesh (the default is 24 hours for each mesh). The term, **TAU**, indicates the hour of a COAMPS forecast. Change the start tau by typing new values in the boxes under the column header of **Start Time**. Change the ending tau by typing new values into the boxes under the column header of **Stop Time**. **NOTE**: any boxes for meshes not already specified in the **Map Panel** are not active. Some restrictions on starting and ending taus include:

- The ending tau must be greater than the starting tau.

- Starting and ending taus of each mesh must fall within the range of the mesh's respective parent.

- Boundary conditions grid data files must be available for the entire forecast period specified for mesh 1.

The **Frequency of Sigma Output** selection button controls the frequency of COAMPS sigma level output. The sigma level output files from COAMPS contain data from both the horizontal and vertical dimensions representing the model's internal computational grid (uninterpolated sigma level data). Currently, sigma level data is used for three-dimensional visualization applications such as Vis5D. The default setting is one hour for sigma level output.

The **Interval of Data Assimilation** is applicable when successive forecasts will be made with COAMPS. The **Interval of Data Assimilation** option instructs the COAMPS forecast to output the necessary fields to initialize the following forecast at the time interval selected. The interval should be set to the time period between the successive forecasts. For example, if a user schedules a COAMPS forecast to execute twice daily, with basetimes twelve hours apart, the **Interval of Data Assimilation** should be set to 12.

The **Analysis of Coarse Mesh** and **Analysis of Inner Meshes** selection buttons allow a user to configure the analysis to include observations for the outer (coarse) mesh and/or the inner meshes. Selections of **FALSE** will prevent observational data from being used in the COAMPS analysis. The default selection for both meshes is **TRUE**. Selections of **TRUE** will not result in an error if no observational data is available.

Additional features of the **Forecast Options Panel** include the **Load File** and **Reset** buttons. The **Load File** button may be used to load a previously defined set of forecast options. Taking advantage of the **Load** function, to load previously saved options, may save time when defining the forecast options. The **Reset** button returns all values to those set at system initialization.

After the forecast options have been designated from the appropriate fields, the users may exit from the **Forecast Control Panel**. The  next to **Forecast** will change to a  as shown in Figure 18.

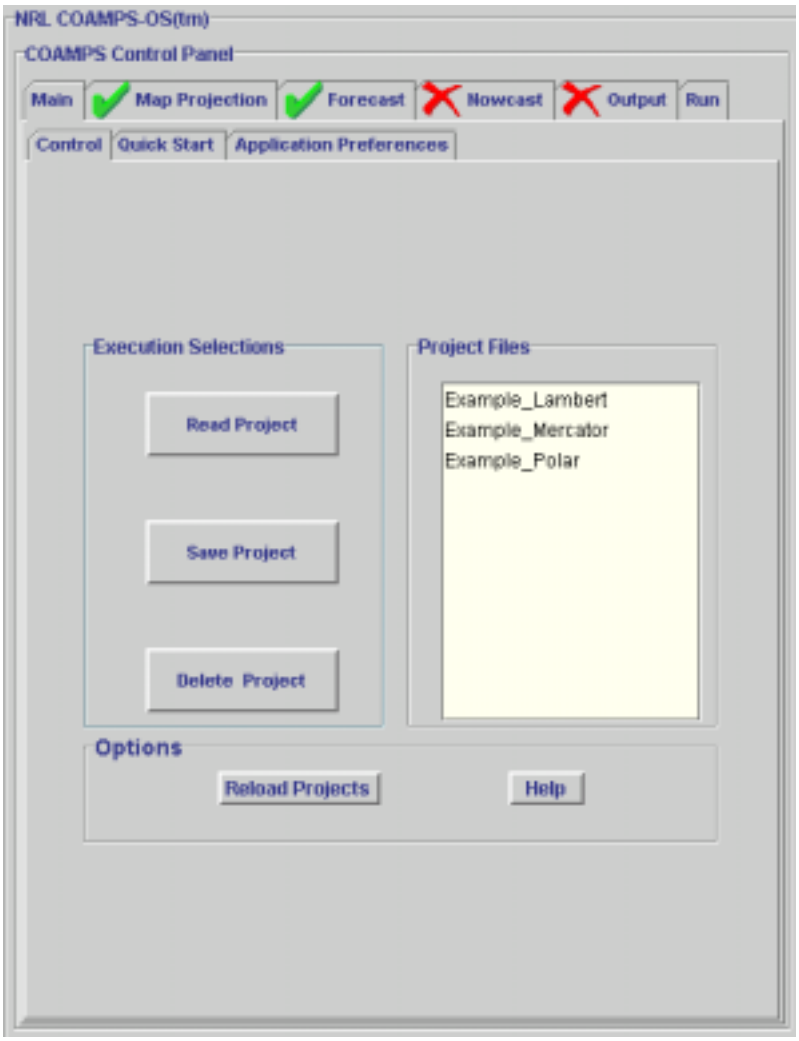


Figure 18. COAMPS-OS GUI after completing Forecast Options setup.

HOW DO I SET THE NOWCASTING OPTIONS?

In the COAMPS data assimilation scheme, the previous model forecast is used as a starting point for the next COAMPS analysis. Observational data is then incorporated into the analysis to initialize the next model forecast. The process of data assimilation is repeated for each COAMPS forecast with most COAMPS sites scheduling COAMPS forecasts to execute every 12 hours. In some cases, a user may wish to determine the current weather conditions without running a forecast; the Nowcast option provides this capability. The COAMPS-OS Nowcast uses the COAMPS analysis to produce the best representation of the current weather conditions using available observational data and previous COAMPS forecasts. By enabling the COAMPS-OS Nowcast, a user may update the TEDS database with gridded data, so the most current data are available to applications.

Clicking on the **Nowcast** tab on the **Main Control Panel** opens the **Nowcast Control Panel** shown in Figure 19.

Enabling the COAMPS-OS Nowcast requires two steps:

- Selecting **YES** from the selection menu on the **Nowcast Panel**
- Scheduling the project to execute in batch mode from the **Run Control Panel** (accessed via the **Run** tab)

NOTE: The COAMPS-OS Nowcast *cannot* be run interactively, it must be scheduled as a batch job.

The **Scheduling Options** determine the times and frequency to run the COAMPS-OS Nowcast. The default values are set to execute the Nowcast hourly between 00Z and 24Z. The only valid intervals are one, two, or three hours. Each Nowcast run is executed 40 minutes after the hour (default) to allow time for observational data to be ingested by the database and transferred to the COAMPS server. The user may modify the Nowcast options using the selection buttons shown in the **Nowcast Panel**.

Additional features of the **Nowcast Control Panel** (Figure 19) include the **Load File** and **Reset** buttons. The **Load File** button may be used to load a previously defined set of Nowcast options. Loading previously saved options may save time when defining the Nowcast options. The **Reset** button returns all values to those set at system initialization.

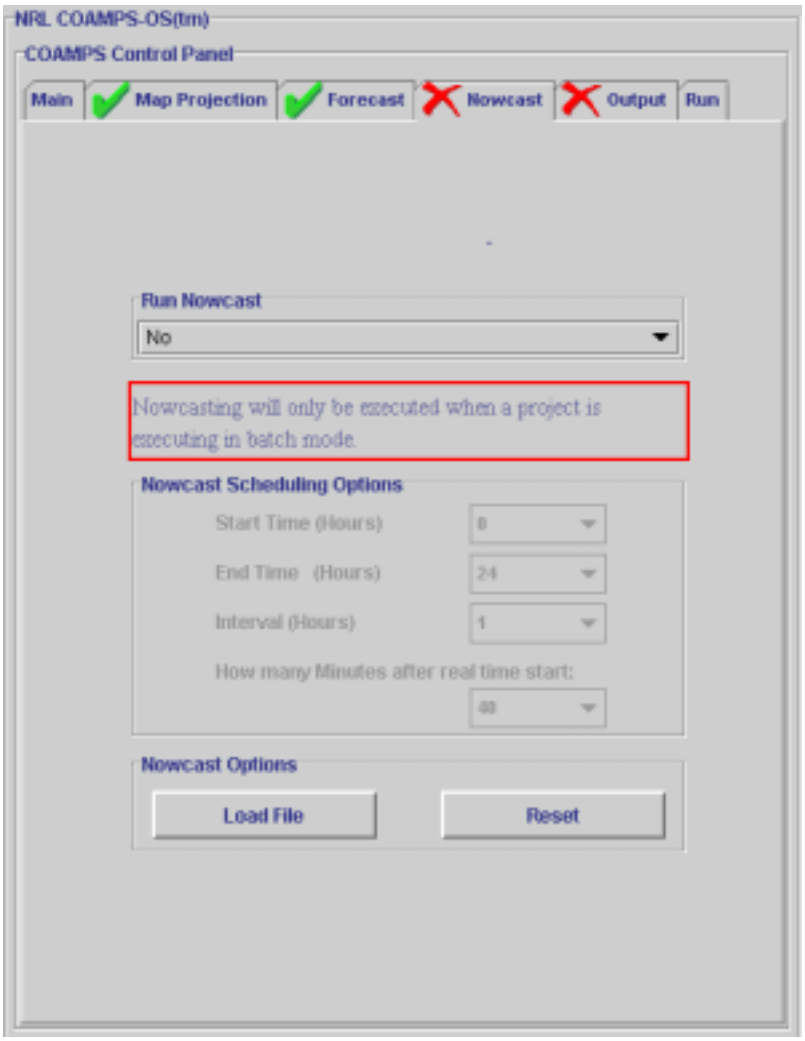


Figure 19. Nowcast Control Panel

After setting the appropriate fields and exiting the **Nowcast Control Panel**, the ✗ next to **Nowcast** will change to a ✓ as shown in Figure 20.

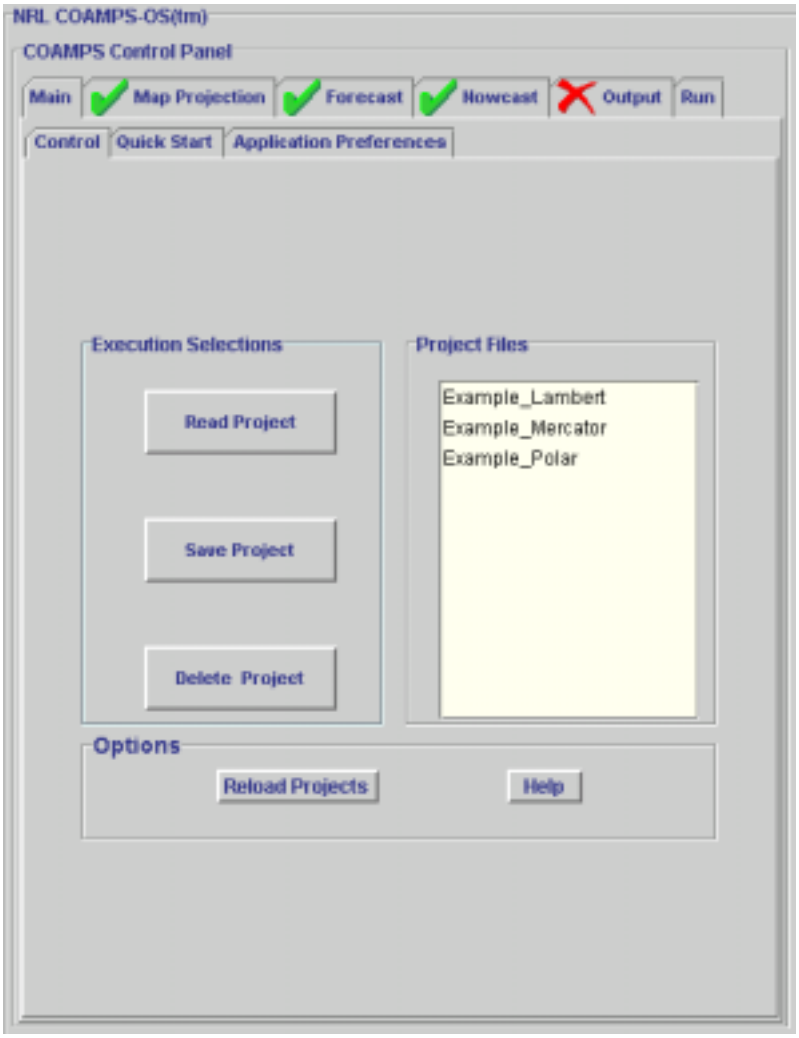


Figure 20. COAMPS-OS GUI after selection of Nowcast Options.

HOW DO I SET THE OUTPUT DATA OPTIONS?

Click on the **Output** tab to open the **Output Control Panel**, shown in Figure 21.

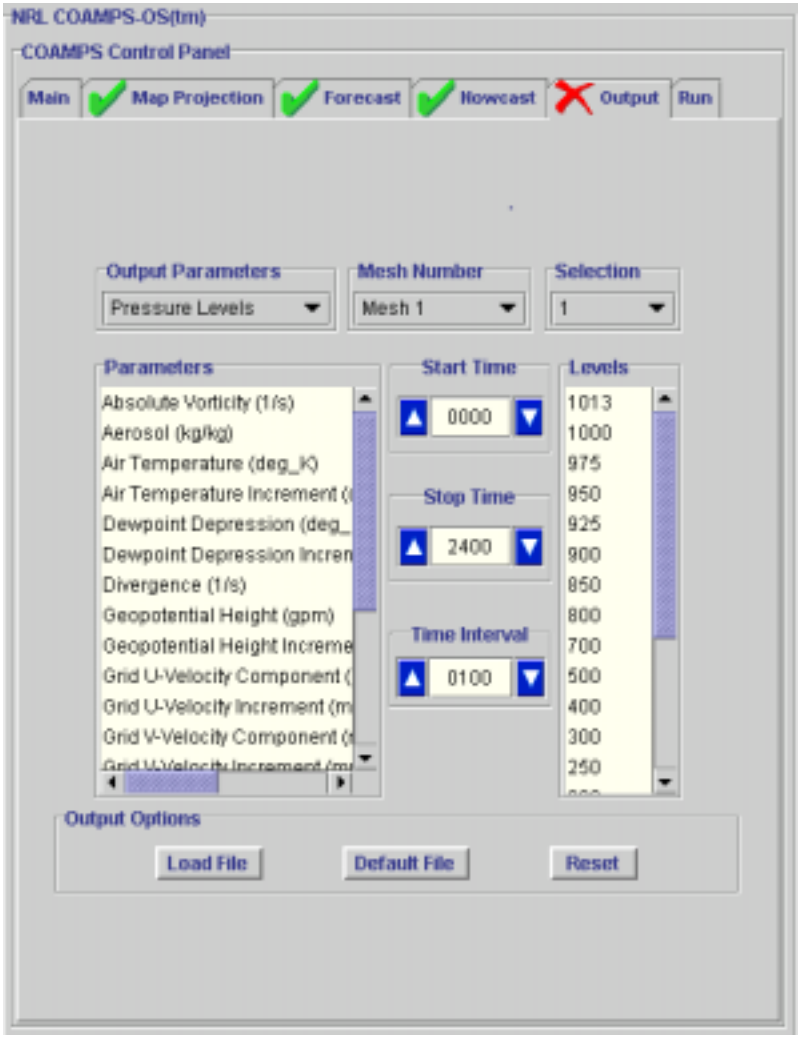


Figure 21. Output Control Panel

The **Output Control Panel** allows the user to select the output fields that COAMPS will produce. The following rules apply to the output selections:

- Select any combination of parameters and times for each selected mesh.
- There is a limit of four different combinations of selections per each output type, time, and mesh
- Select any number of items per parameter type and mesh type; there are no limitations. Press the **CTRL** key for individual selections, or use the **SHIFT** key for sequential selections.

- COAMPS output is limited to items selected. In other words, the selected items will be the only output from COAMPS that will be processed into graphical products and therefore displayed on the COAMPS-OS web pages.

The examples below will demonstrate use of the **Output Control Panel** for selecting fields and levels to be output by COAMPS. A description of each of the available controls in the **Output Control Panel** follows.

- The **Output Parameters** button allows the user to select among pressure level parameters, height surface parameters, and surface parameters.

- The **Mesh Number** button allows the user to select a particular mesh for subsequent editing.

- The **Selection Number** permits the user to select different combinations of parameters and times for each output parameter and mesh type. Only four different combinations may be used.

- The **Start Time** indicates the time to start to output the selected parameters. The values are entered as hours and minutes in a **HHMM** format.

- The **Stop Time** indicates the time to terminate the output of the selected parameters. The values are entered as hours and minutes in a **HHMM** format.

- The **Time Interval** indicates the frequency to output the selected parameters. The values are entered as hours and minutes in a **HHMM** format. The arrow buttons allow the user to increase or decrease the time interval by an amount consistent with the COAMPS time step.

- The **Load File** button may be used to load a previously defined set of output selections. Loading previously saved output fields may save time when defining the output parameters.

The following examples demonstrate the use of the **Output Control Panel**.

Example 1: Choosing Parameters for Pressure Levels

1. Choose **Pressure Levels** from the **Output Parameters** menu.

2. Choose the mesh from the **Mesh Number** menu.

3. Choose the selection number from the **Selection** menu.

4. Select the parameters to be output by single clicking on each one. A selected parameter will be highlighted in purple. Deselect a parameter with a single click on the highlighted parameter. Figure 22 shows the **Output Control Panel** with a group of selected parameters.

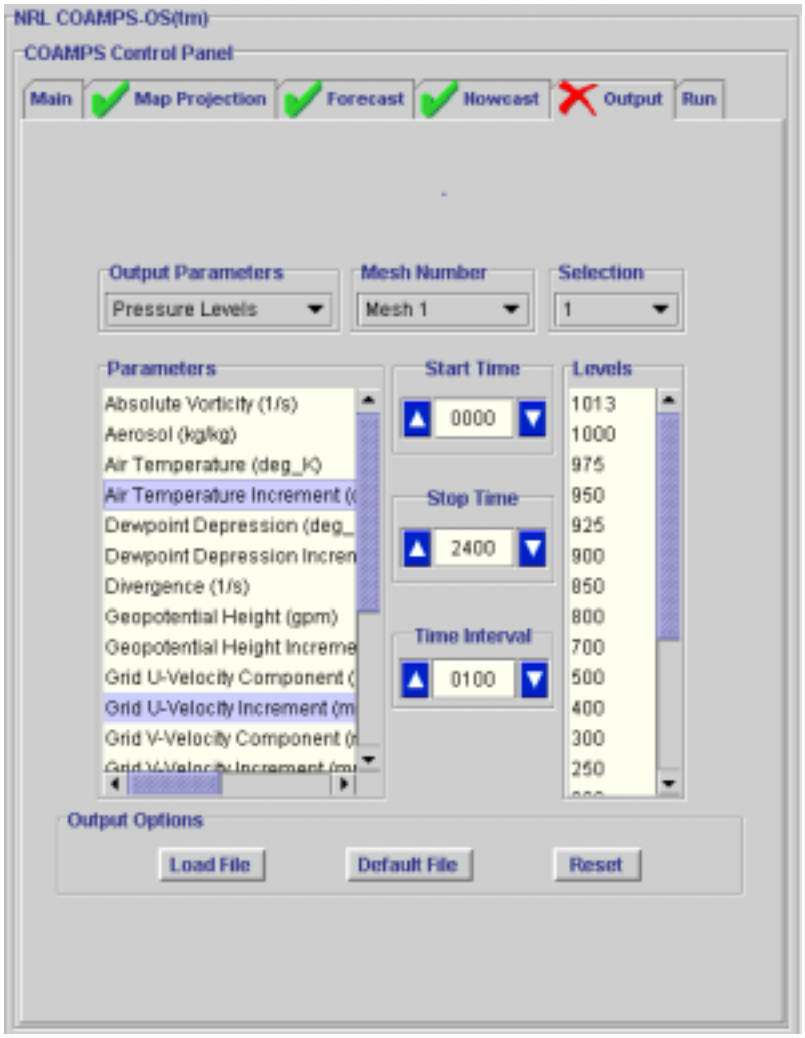


Figure 22. Output Control Panel with Pressure Parameters highlighted.

5. Select the pressure levels for the parameters by single clicking on each desired level. All parameters will be output on all levels selected. Figure 23 shows the **Output Control Panel** with pressure levels highlighted for the selected parameters.

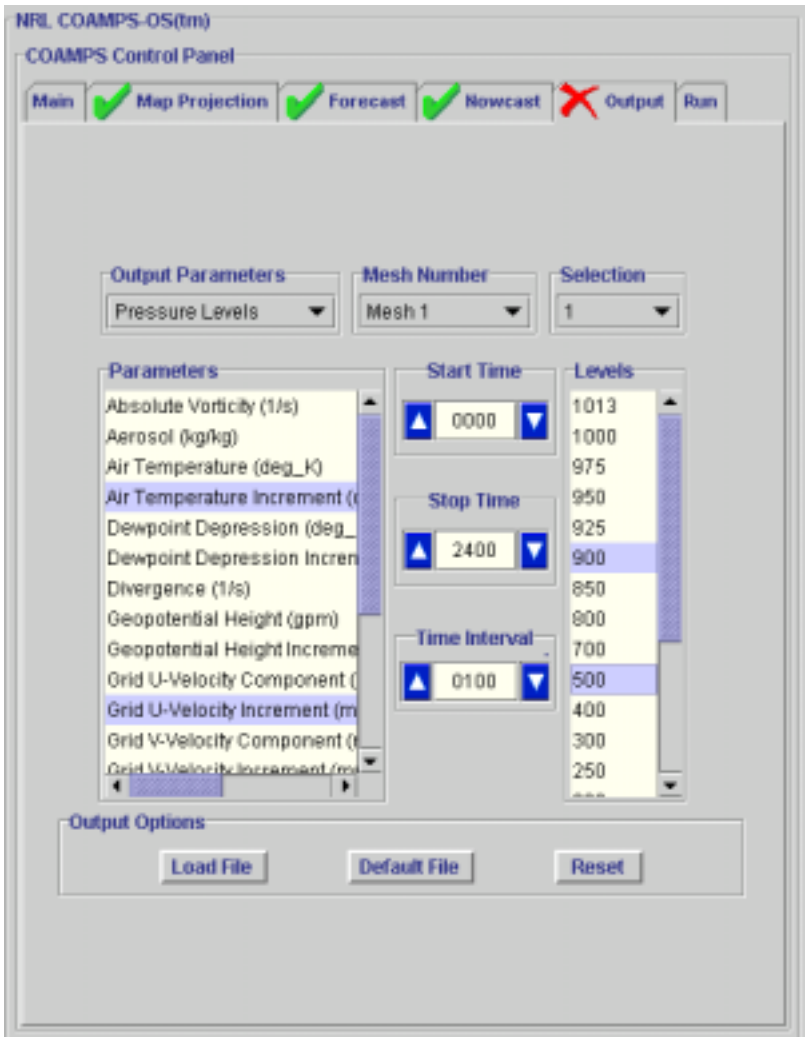


Figure 23. Output Control Panel with Parameters and Levels selected.

6. Enter the **Start Time**, **Stop Time**, and **Time Interval**. The **Start Time** and **Stop Time** are forecast hours (tau) from the COAMPS basetime. A **Start Time** of 1200 (12 hours and 00 minutes) instructs COAMPS to output fields beginning at tau 12. Similarly, a **Stop Time** of 2400 instructs COAMPS to terminate output at tau 24.

7. After completing steps 1-6, click on the **Selection Number** button to start a new selection. The new selections may be for pressure levels with different parameters, levels, or times, or the new selections may use a different **Output Parameters** option.

Example 2: Selecting Data for Height Surfaces

When **Height Surface** on the **Output Parameters** menu is selected, the **Output Control Panel** displays the height level selections as shown in Figure 24.

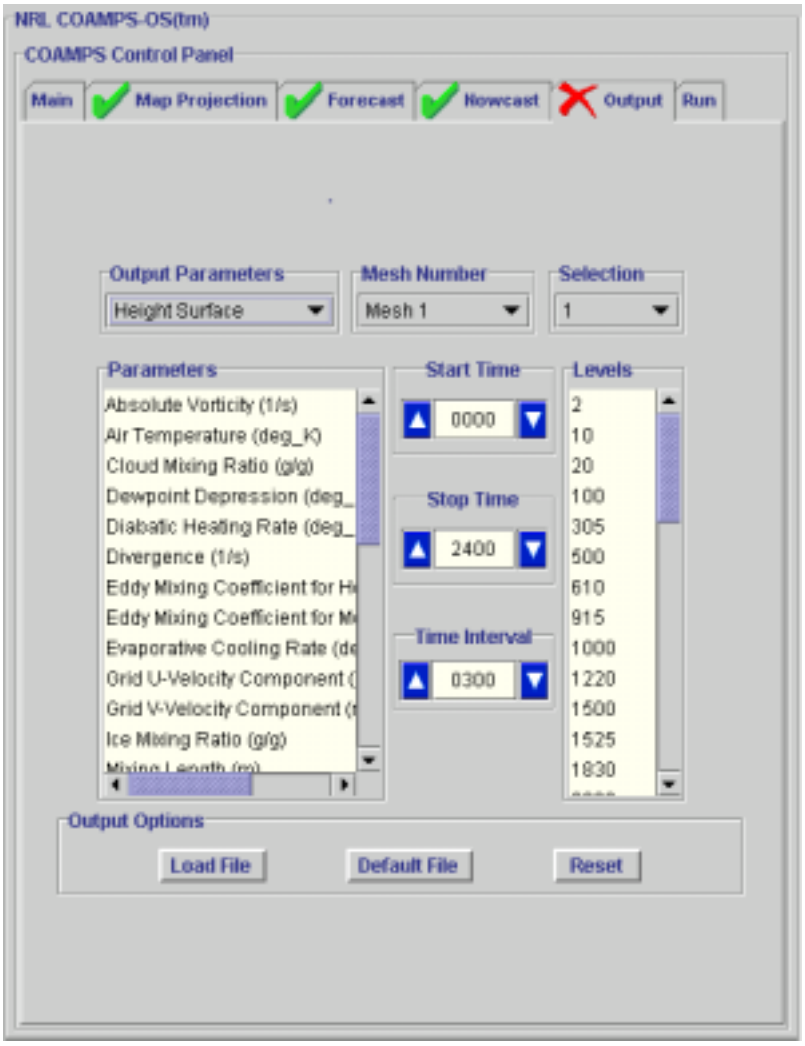


Figure 24. Output Control Panel showing Height Surface Parameters.

The two list boxes show the available parameters (on the left) and the standard height surfaces (on the right). Specify height surface output parameters with the following steps:

1. Ensure that the **Selection Number** button is set to the desired selection number. Selections from different **Output Parameters** or **Mesh Number** will not overwrite each other.

2. Select the desired **Height Surface Parameters**. Single click on each desired parameter. After selecting the height surface parameters, the screen should appear as shown in Figure 25.

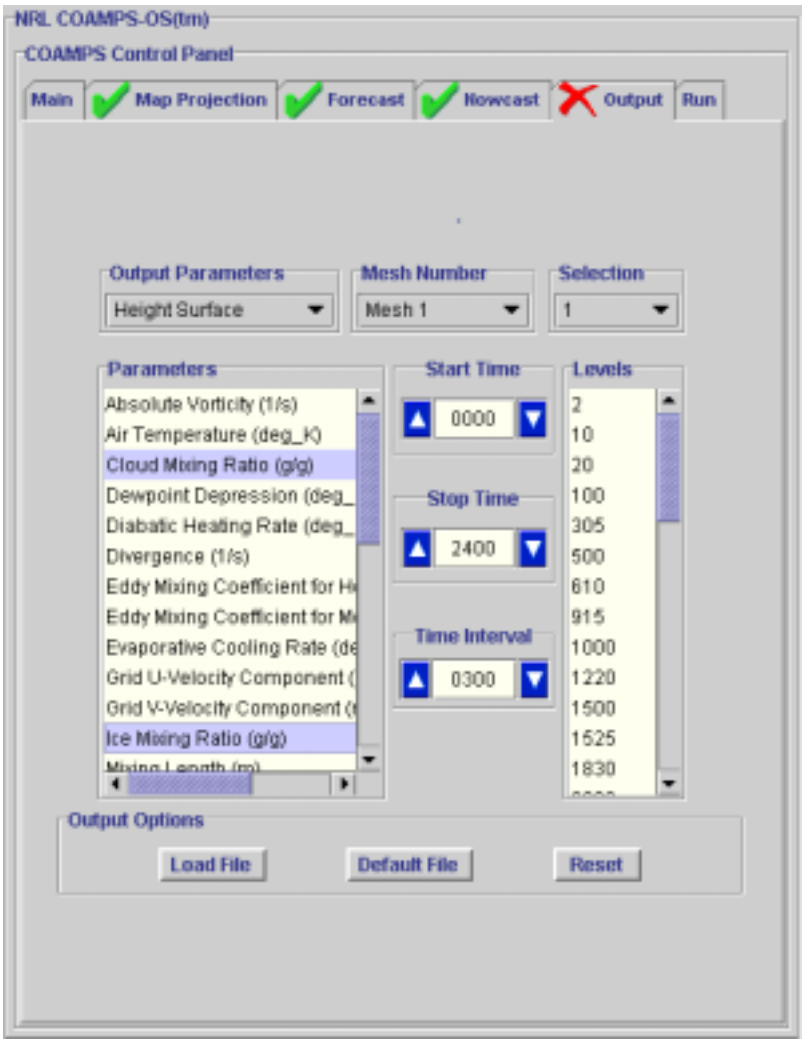


Figure 25. Output Control Panel with Height Parameters selected.

3. Select the **Levels** for the selected parameters. Click on each desired height. Toggle a selected level off by clicking on the level again. After completing the selections, the screen should resemble Figure 26.

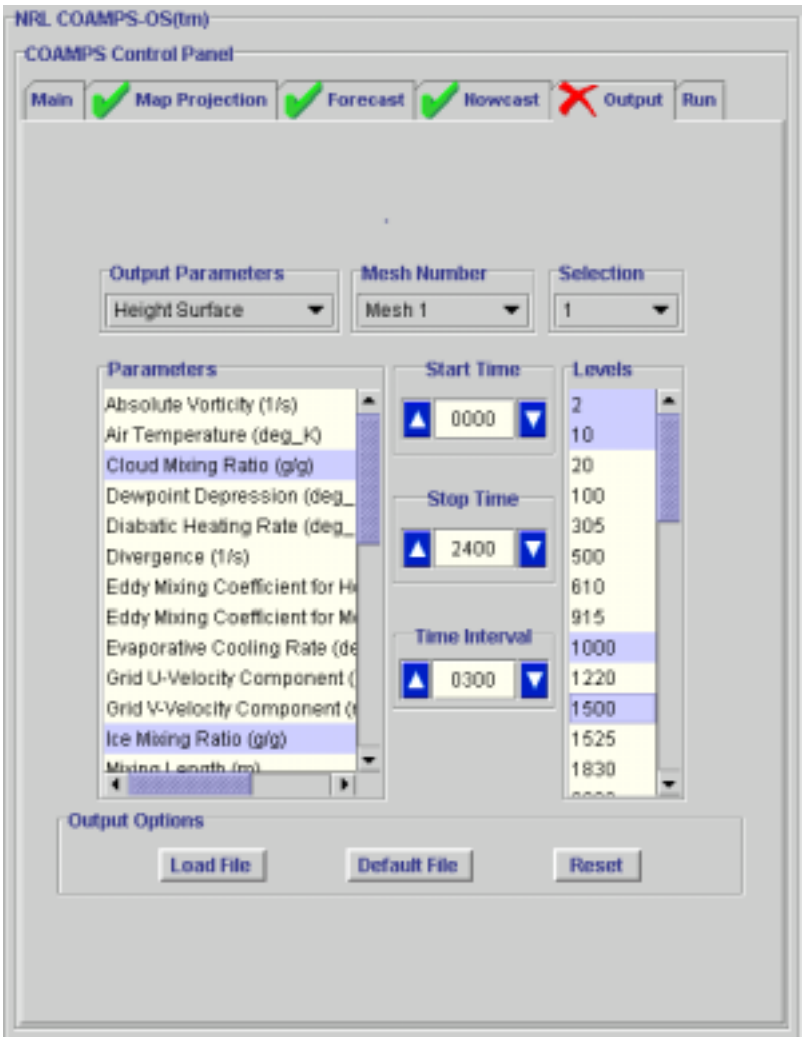


Figure 26. Output Control Panel with Height Parameters and Heights selected.

4. Set the **Start Time**, **Stop Time**, and **Time Interval** for the forecasts. The **Start Time** and **Stop Time** are forecast hours (tau) from the COAMPS basetime. A **Start Time** of 1200 (12 hours and 00 minutes) instructs COAMPS to output fields beginning at tau 12. Similarly, a **Stop Time** of 2400 instructs COAMPS to terminate output at tau 24.

5. Click on the **Selection** button to begin a new selection. The new selections may be on height surfaces with different parameters or levels or times, or the new selections may use a different **Output Parameters** option.

Example 3: Selecting Output for Surface Parameters

Selecting the **Surface Levels** option on the **Output Parameters** selection button displays the **Surface Parameters** options in the **Output Control Panel**, as shown in Figure 27.

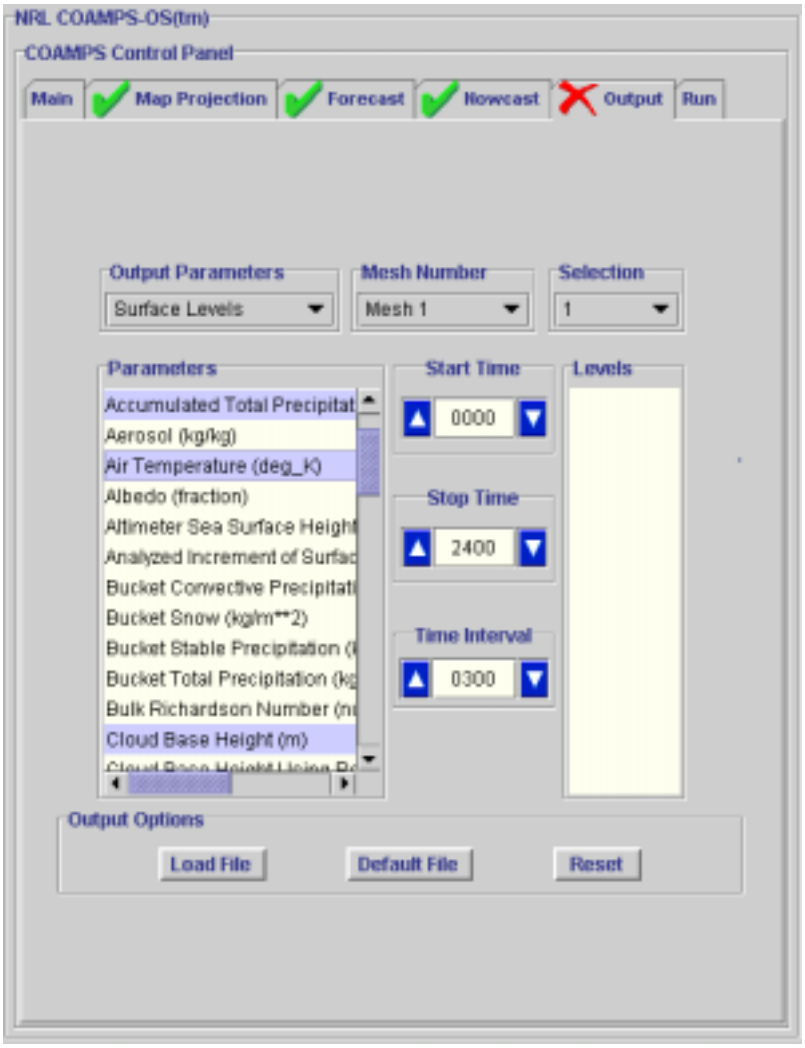


Figure 27. Output Control Panel showing Surface Parameters.

The **Surface Parameters** have no level selection since surface is implied. Select surface parameters for output by clicking on each desired parameter. Deselect a selection with a single click on the highlighted parameter. Set the **Start Time**, **Stop Times**, and **Time Interval** to control the output frequency, as described in step 4 of example 2. The **Selection** button may be used to start a new selection.

Additional features of the **Output Panel** include the **Load File, Default File,** and **Reset** buttons. The **Load File** button may be used to load a previously defined set of output options. Loading previously saved options may save time when defining the output options. The **Default File** button allows the user to load a set of output parameters

initially selected defined by NRL at Monterey, CA. The user may then select additional parameters or deselect parameters. The **Reset** button returns all values to those set at initialization.

Example 4: Complete the Output Data Selection Process

If the **Output** selection is complete, click on another tab in the COAMPS-OS GUI, and all of the output parameters selected will be verified.

The COAMPS-OS GUI will display a ✔ next to the **Output** tab, as shown in Figure 28, after all selections have been verified.

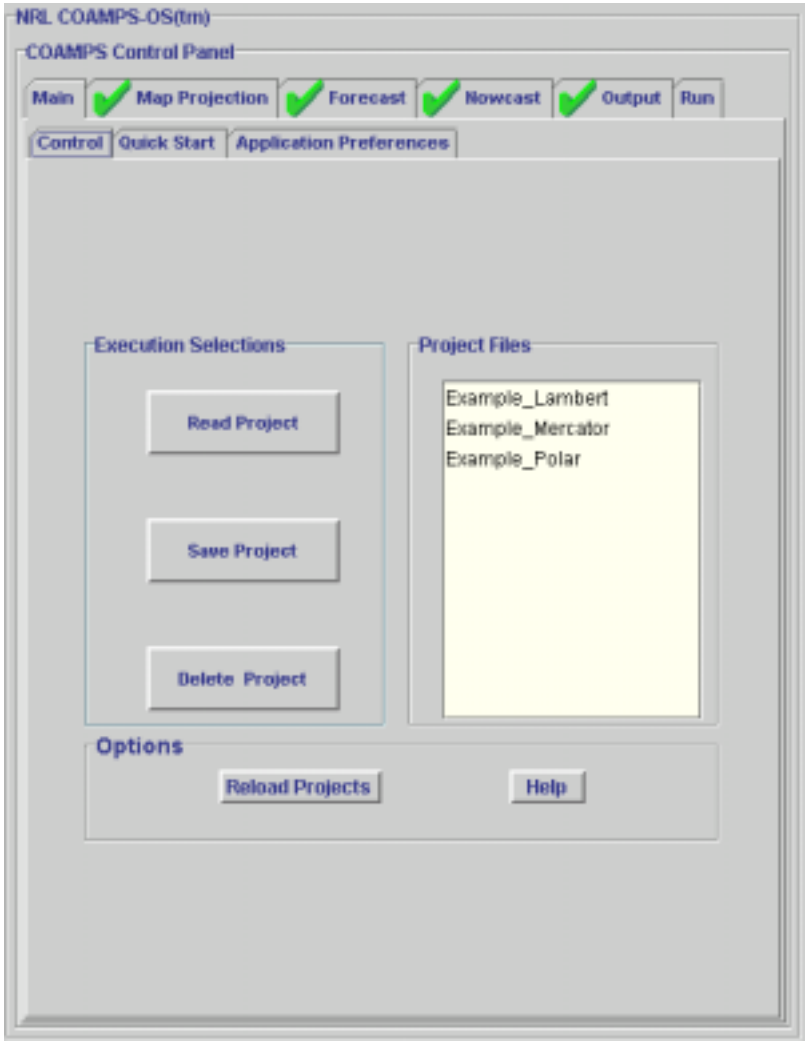


Figure 28. COAMPS-OS GUI with Output Data Selection completed.

HOW DO I RUN COAMPS?

The **Run Panel** (Figure 30) allows the user to execute the COAMPS model immediately or setup a batch run. A brief description of the **Run Panel** options is provided below with step-by-step instructions for running the model.

The **Run Mode** menu has the following options:

- **Generate COAMPS Namelist Only**: Generates the input files for COAMPS without running the model. The **Generate COAMPS Namelist Only** option allows a user to check the namelist files in the COAMPS-OS Remote Monitor before executing COAMPS.

- **Execute COAMPS Analysis**: Starts the COAMPS analysis when the **Run COAMPS NOW** button is clicked.

- **Execute COAMPS Forecast**: Starts the COAMPS forecast when the **Run COAMPS NOW** button is clicked. Each COAMPS forecast requires fields produced by the COAMPS analysis.

- **Execute COAMPS Analysis & Forecast**: Starts the COAMPS analysis and COAMPS forecast when the **Run COAMPS NOW** button is clicked.

The **COAMPS Start Time – NOGAPS BaseTime** list box displays the available data sets the user may select for the model run. The user may update the list of datasets by selecting the **Reload Start Times** button in the **Run** panel.

The **Selected Start Time** defines the starting model execution data set. The **Start Time** has a default value of ***current-dtg*** (current datetime group). A selection of ***current-dtg*** will start the model using the current atmospheric and oceanographic data. A COAMPS **Start Time** must be specified. A user may select a datetime group from the list of available datetime groups by single clicking on the group. If only one dataset is selected the same dataset is used for both the start and stop times.

The **Selected Stop Time** defines the ending model execution dataset. The default stop time is set to the start time. A user may select a different stop time to execute the model for more than one datetime group. Select a different stop time by pressing the **SHIFT** key and single clicking on a datetime group in the list box. An interval of datetime groups will be highlighted from the selected start time to the selected stop time

Additional features of the **Run Panel** include the **Reload Start Times, Run COAMPS NOW,** and **Reset** buttons. The **Reload Start Times** button may be used to update the **COAMPS Start Time – NOGAPS BaseTime** list box with the latest data available. The **Run COAMPS Now** button allows the user to immediately start the model execution for the presently displayed project. The **Reset** button returns all values to those set at initialization.

After the model setup has been completed, the user must click on the **Save Project** button in the **Main Control Panel** to save the configuration for a COAMPS forecast before execution of the model.

After the project is saved, the user can reuse the configuration files without repeating the processes described in the previous sections. All configuration settings are stored under a single project name. Users may recall a saved project using the **Read Project** button in the **Main Control Panel**. The user will *always* be prompted to verify that the latest model configuration files have been saved upon entering the **Run Panel**.

All tabs should have  symbols before proceeding to run COAMPS. Execute the model run by following the steps below.

1. Click on the **Save Project** button to open the **COAMPS Project Save Dialog** shown in Figure 29.

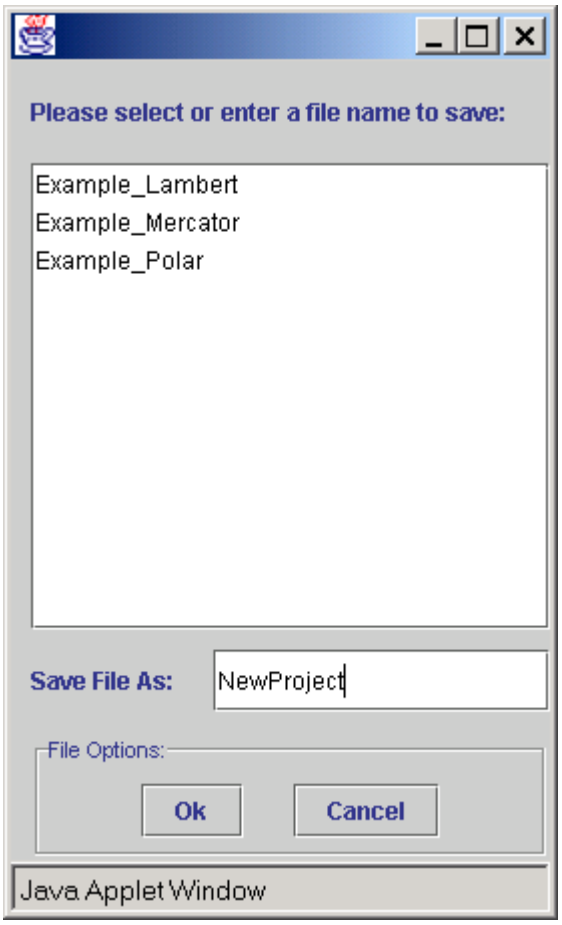


Figure 29. COAMPS Project Save Dialog

Type a name in the **Save File As:** field, or select a project name from the available projects. **NOTE**: No spaces or periods are allowed in the project name. Click **OK** to save the project.

2. Move to the **Main Control Panel**, and click the **Run** tab. Selecting the **Run** tab opens the **Run Setup Control Panel** shown in Figure 30.

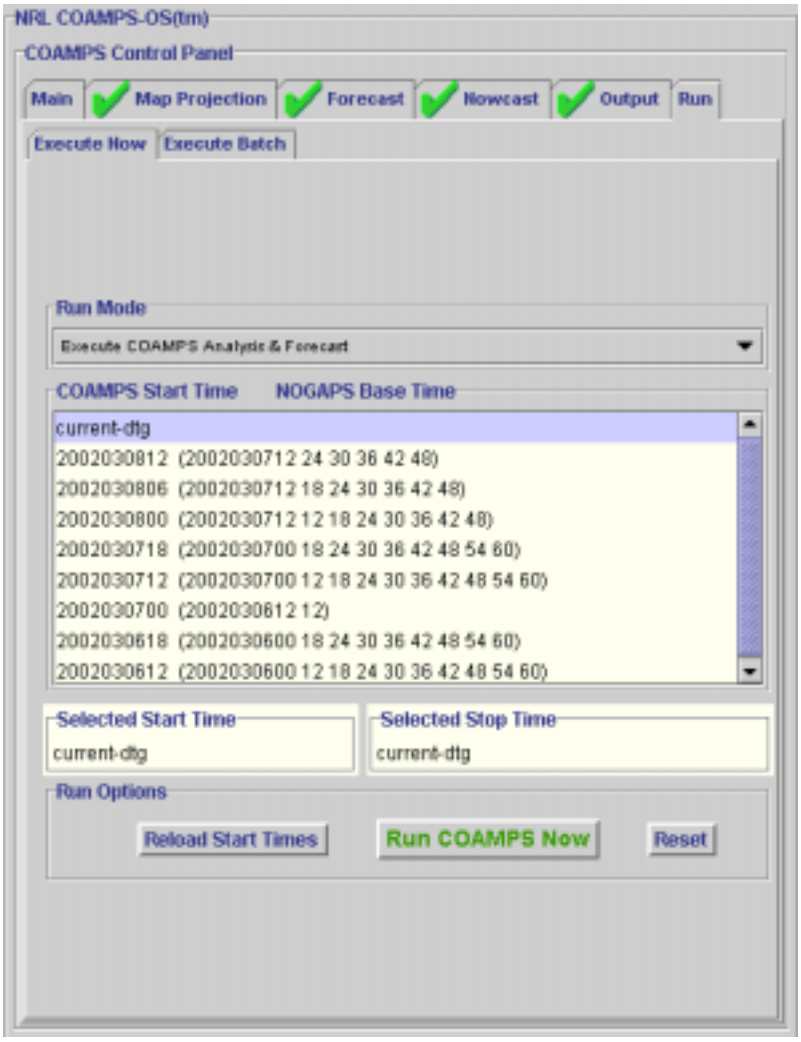


Figure 30. Run Setup Control Panel

3. Select the **Run Mode**. The **Run Mode** selection button has the following options:

   - Select a start time. The default start time is ***current-dtg*** (current datetime group). A selection of ***current-dtg*** will start the model using the current atmospheric and oceanographic data. A COAMPS start time must be specified. A user may select a datetime group from the list of available datetime groups by single clicking on the group.

   - Select a stop time. The default stop time is set to the start time. A user may select a different stop time to execute the model for more than one datetime group. Select a different stop time by pressing the **SHIFT** key and single clicking on a datetime group in the list box. An interval of datetime groups will be highlighted from the selected start time to the selected stop time.

4. If the user wishes to run the COAMPS model immediately, click on the **Run COAMPS NOW** button. Clicking the **Run COAMPS NOW** button opens a **Run Time Estimate** dialog as shown in Figure 31. The dialog shows an estimated run time for the project and allows the user to change the project configuration before starting a COAMPS forecast. Click the **Cancel** button to cancel the run and change the project configuration. Users *must* re-save the project after making any changes in order for the changes to be saved with the project for a future run. If no changes are desired, click **OK** in the **Run Time Estimate** dialog to start a COAMPS forecast with the saved project configuration.

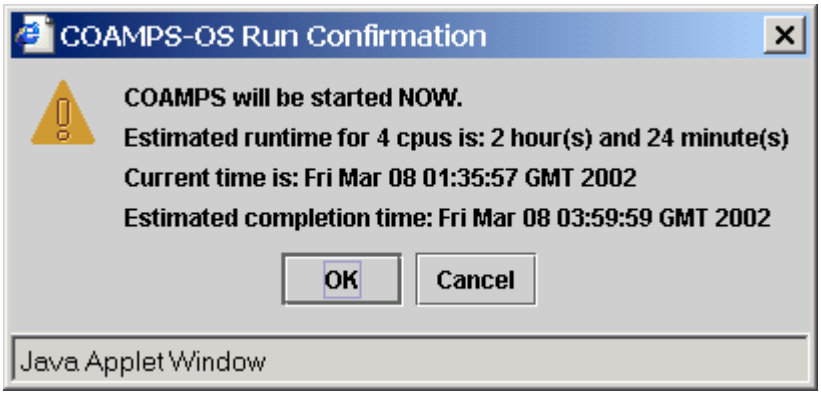


Figure 31. COAMPS-OS Run Confirmation

5. After the **OK** button has been selected, COAMPS will start immediately. The user will be informed that COAMPS has started, and a separate web browser window will open displaying the COAMPS-OS Remote Monitor as shown in Figure 32.

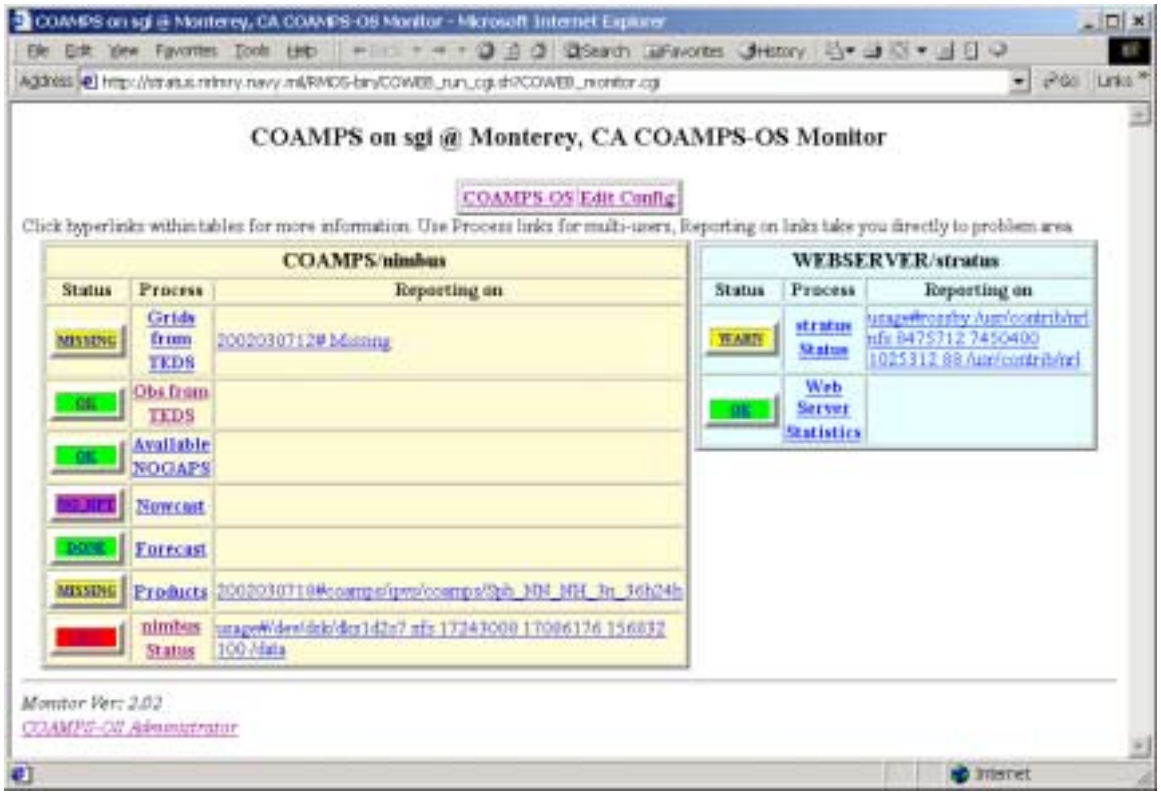


Figure 32. COAMPS-OS Remote Monitor

The COAMPS-OS Remote Monitor is continually updated every five minutes. All status messages generated by a COAMPS forecast will appear in the Remote Monitor. Output fields generated by COAMPS are copied to the TEDS database during the forecast.

6. If a user requires a scheduled COAMPS forecast to start at a specific time every day, click on the **Execute Batch** tab in the **Run Settings Control Panel**. Selecting the **Execute Batch** tab opens the **Batch Setup Control Panel** shown in Figure 33.

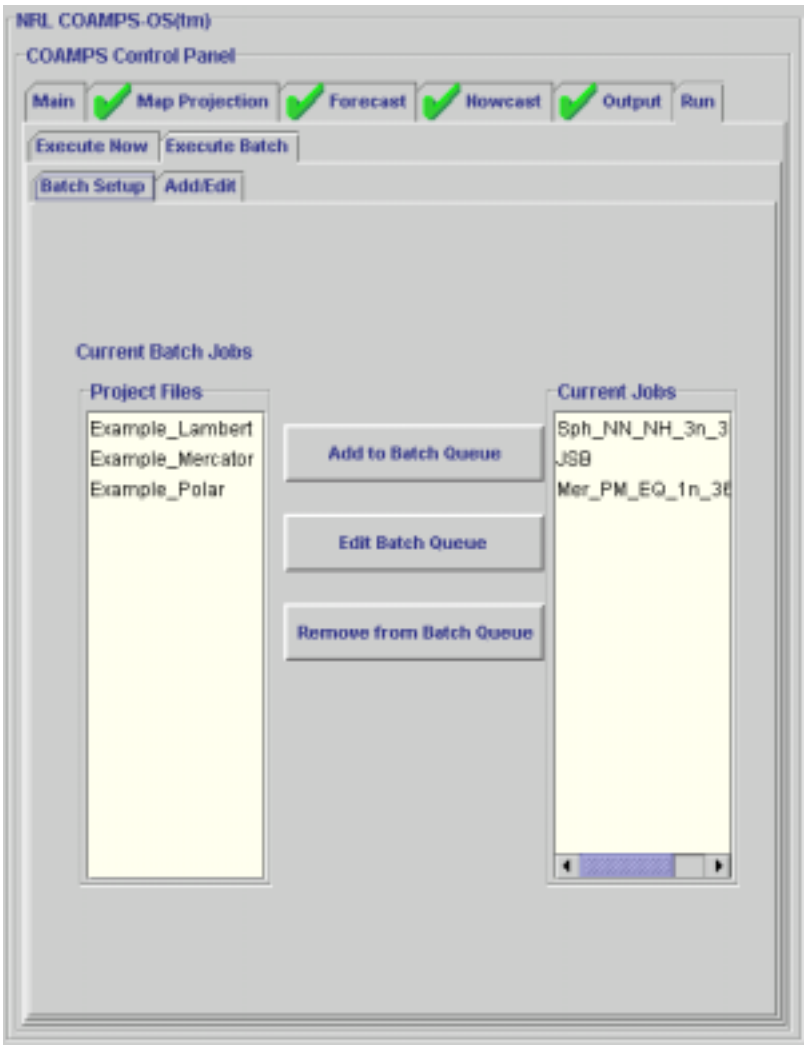


Figure 33. Batch Setup Control Panel

- Select a project from the **Project Files** listing and click on the **Add to Batch Queue** button. Clicking the **Add to Batch Queue** button opens the **Add Batch Job Control Panel** shown in Figure 34.

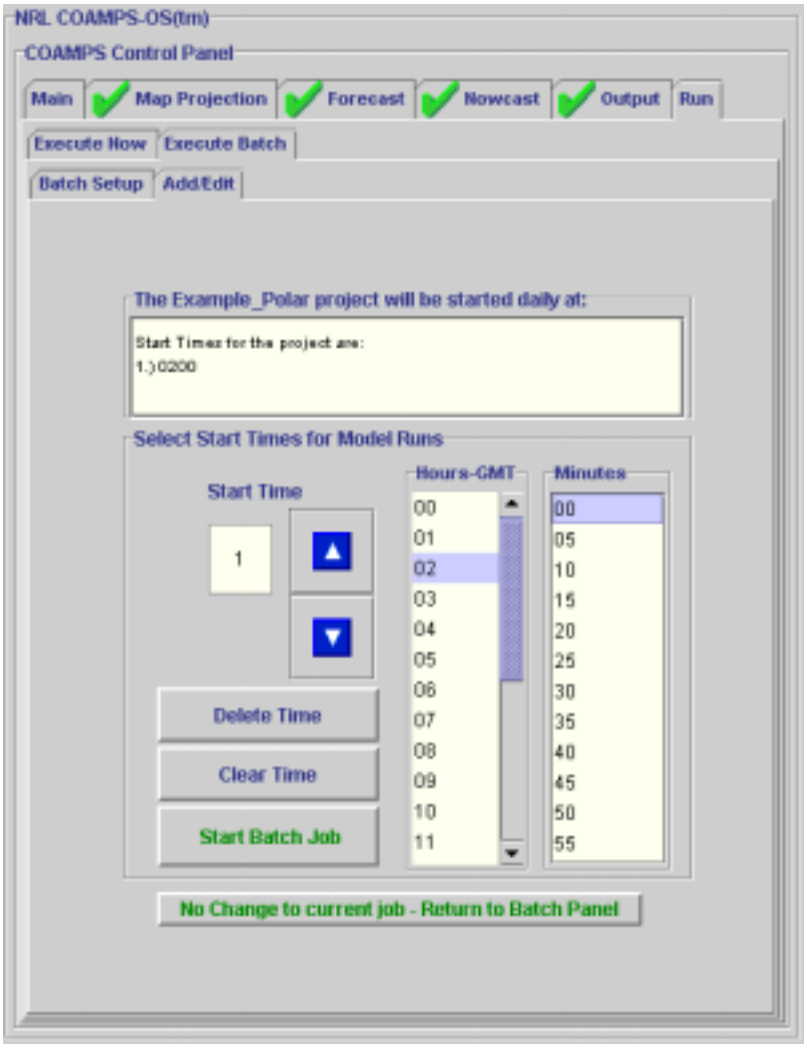


Figure 34. Add New Batch Job Control Panel

The user may use the **Add New Batch Job Control Panel** to schedule start times for COAMPS forecasts. The forecasts will be started automatically at the scheduled times every day without further operator intervention. For each **Start Time**, select the hours (GMT) and minutes of the desired time to begin the run. When a selection is made, the selected start time will appear in an enumerated list as shown in Figure 35. If an additional start time is desired, click the directional buttons to select a different **Start Time**. The user may specify up to 24 start times. Figure 35 shows the **Add Batch Job Control Panel** with two start times specified. Delete one of the start times using the **Start Time** directional buttons to advance to the time, and clicking the **Delete Time** button.

Clicking the **Clear Time** button clears the currently selected **Start Time** and allows a new time to be entered.

NOTE: The user must have permission to access the *cron* (UNIX computer scheduling daemon) to schedule a batch job. Contact the COAMPS-OS system administrator if problems occur when scheduling a COAMPS batch job.

A COAMPS forecast should be scheduled when the most observational data is available at the forecast basetime. Typically, observational data will be available on the COAMPS server +1 or +2 hours following the time of the observation.

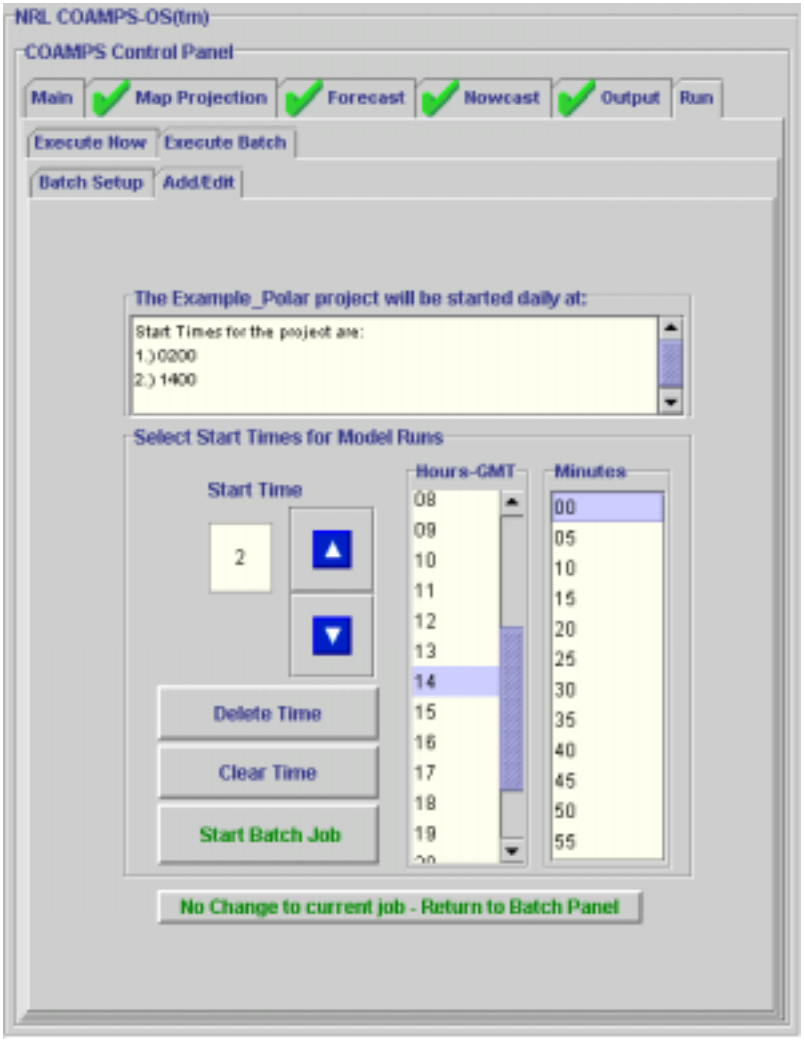


Figure 35. Add New Batch Job Control Panel with a Second Start Time Selected.

After the desired start times have been specified, click the **Start Batch Job** button to start the batch job. A COAMPS forecast with the specified project will be started automatically at each scheduled start time every day.

HOW DO I RE-USE AN EXISTING COAMPS PROJECT?

The **Read Project** button in the **Main Control Panel** may be used to read and reuse a previously saved project. The user must first highlight a project from the **Project Files** list box. After clicking the **Read Project** button, the highlighted project will be loaded, and the image in the **Map Panel** will be updated to display the geographical region for the selected project (Figure 36).

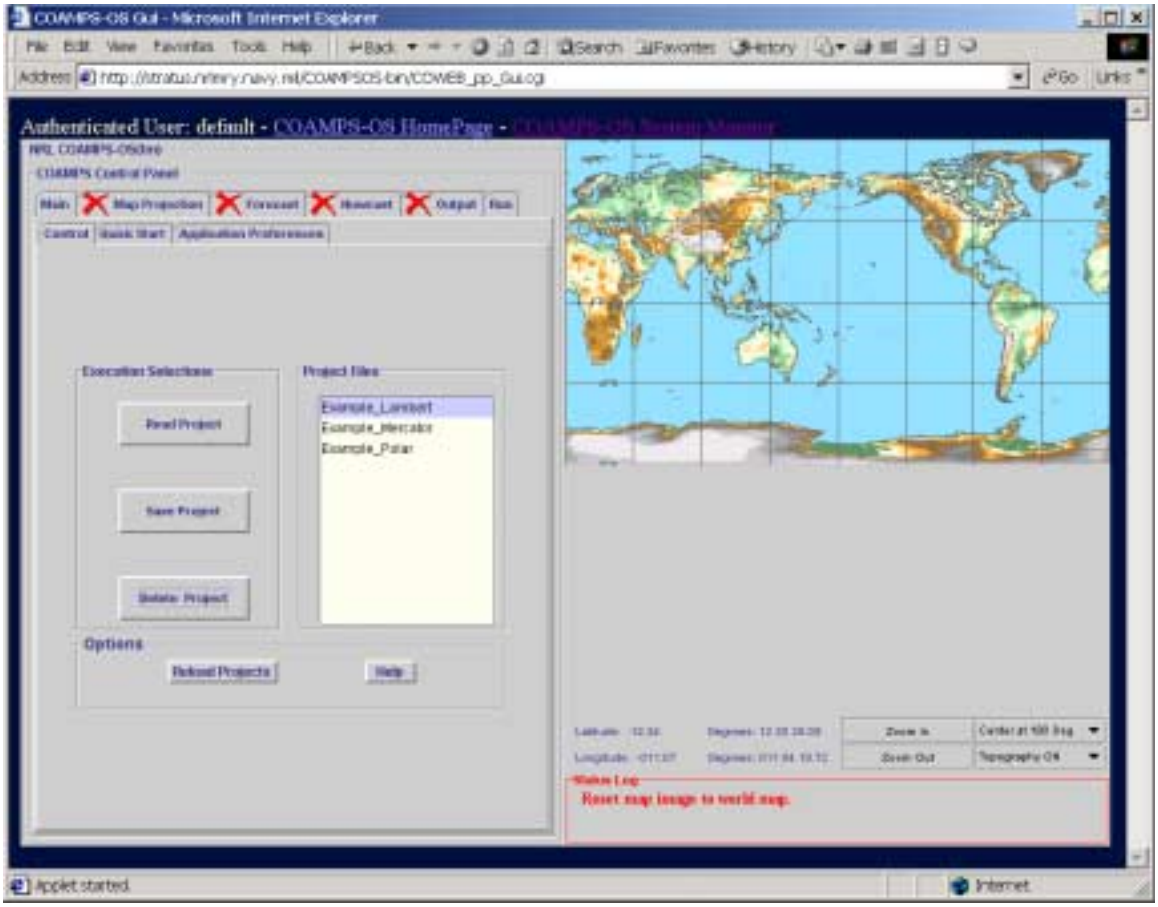


Figure 36. COAMPS Main Panel - Read Project

Open a project by clicking on the project name, and then clicking the **Read Project** button. After opening a project, all ✗ symbols in the **Main Control Panel** will change to ✓ symbols indicating that a COAMPS forecast may be started. Loading, editing, and saving a previously saved project with a different name are encouraged to save time in creating a new project.

HOW DO I DELETE A PROJECT?

If a user is certain a project is no longer needed, the project may be deleted. Delete a project by clicking on the project name, and clicking the **Delete Project** button in the **Main Control Panel**. A **Delete Option** dialog will appear as shown in Figure 37.

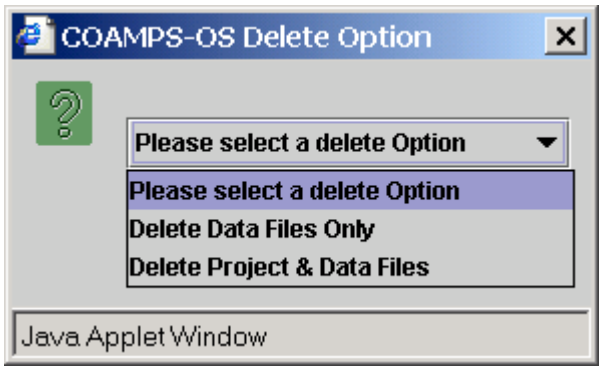


Figure 37. COAMPS Main Panel - Delete Dialog

The **Delete Option** dialog gives the user the option to either delete the project configuration and data files or to delete only the project data files. The data files include output from COAMPS, graphical products, and web page contents for the specified project. The project files are the configuration files and files created by the GUI. The deletion process will begin without further confirmation after selecting a delete option and selecting **OK**. Deletion of the project files will also result in the removal of the batch job entries for that project.

HOW DO I SET APPLICATION PREFERENCES?

The user may define additional options for COAMPS-OS by clicking on the **Application Preferences** button in the **Main Control Panel**. Selecting the **Applications** tab opens the **Application Preferences Control Panel** shown in Figure 38. The **Applications Preferences Control Panel** allows users to set the locations of configuration files used by COAMPS and COAMPS-OS. Change any selection by clicking on the button with the directory description name (e.g. **Output Archive**) and selecting a new directory from the file selection box. The **Reset** button returns all fields to the initially defined values.

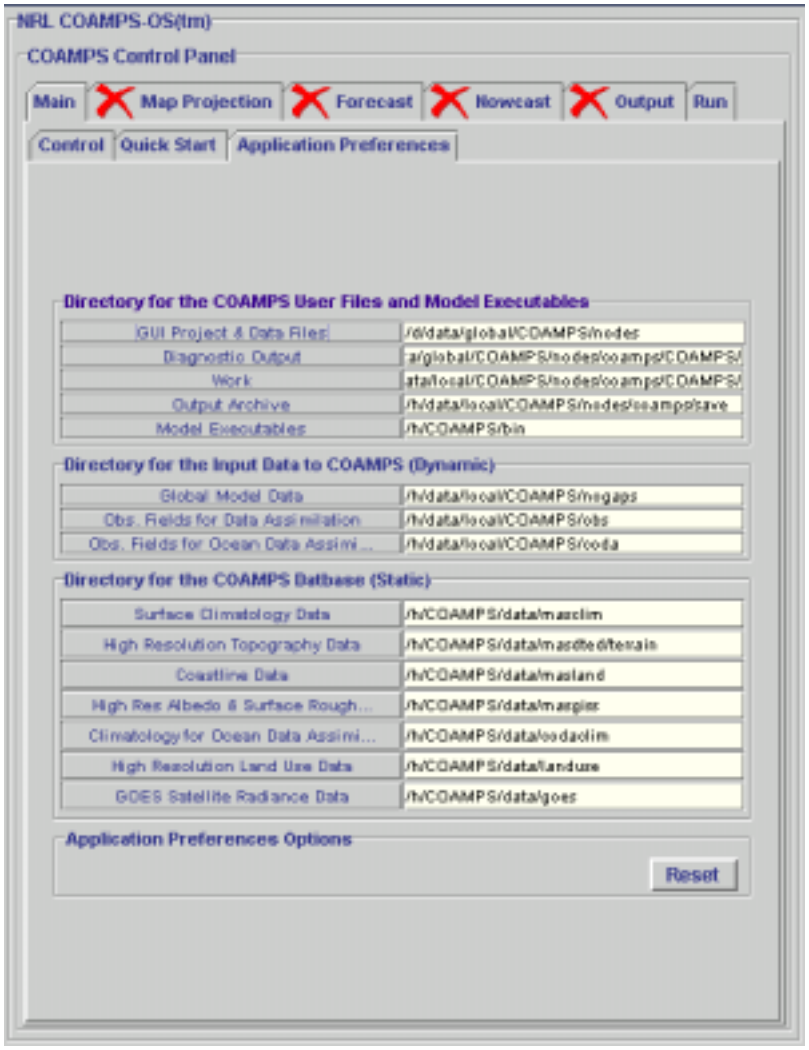


Figure 38. COAMPS Application Preferences

PART 3 – USING THE COAMPS-OS GRAPHICAL USER INTERFACE (GUI)

Part 3 provides detailed descriptions of the options available in each of the COAMPS-OS windows. The descriptions reinforce the project-oriented discussion of Part 2.

THE COAMPS-OS MAIN CONTROL PANEL

The COAMPS-OS GUI is the central control for all COAMPS functions. The COAMPS-OS GUI allows users to create and configure a COAMPS project, schedule a daily forecast, or start a forecast interactively.

COAMPS-OS GUI Features:

- The  is an indication that the associated control panel has not been edited, and/or the panel does not contain sufficient information to execute properly.

- The  indicates a control panel has been edited or the required information has been read from a previously defined project. A panel with a  has the minimal information required to execute COAMPS.

The first tab encountered by the user upon opening the COAMPS-OS GUI is the **Main Control Panel**.

Main Control Panel selection buttons:

- The **Read Project** button allows the user to select a project file to load into the COAMPS-OS GUI. A file may be selected from the **Project List** by single clicking its filename.

- The **Save Project** button opens a file selection box. A user may select a project or enter a new project name to save. A project may be selected by single clicking the left mouse button on the filename and selecting **OK**, or by typing in the project name. All project names *must* be single words with no spaces or periods. The project name will be checked, and the user will be informed if the project name does not conform to standards.

- The **Delete Project** button opens the **Delete Options** dialog. A user must highlight a project name before selecting the **Delete Project** button. The **Delete Options** dialog will appear to allow selection of the deletion options.

- The **Quick Start** tab allows the user to quickly setup a project using all the default values for executing COAMPS.

- The **Application Preferences** tab button opens the **Application Preferences Control Panel**. The **Application Preferences Control Panel** allows the user to modify the directory locations of various COAMPS-OS configuration files.

Other Control Panels of the COAMPS-OS GUI:

- The **Map Projection** tab opens the **Map Projection Control Panel**.
- The **Forecast** tab opens the **Forecast Options Control Panel**.
- The **Nowcast** tab opens the **Nowcast Control Panel**.
- The **Output** tab opens the **Output Control Panel**.
- The **Run** tab opens the **Run Control Panel**. The **Run Control Panel** allows the user to either run the project immediately or schedule a batch job for the project.

In all cases, a  replaces the  to indicate a panel has been completed satisfactorily.

THE QUICK START CONTROL PANEL

The **Quick Start Control Panel** allows the user to quickly set up a COAMPS model run with minimal input. The user is required to input a center position and a filename for the saved project. The project will use all the default values for the model run. The default values are listed below.

COAMPS Model Input Parameters	Default Setting
Projection Type	Defined by position of center latitude and longitude input by user.
Standard Latitude 1	22.5° Mercator 60° for Lambert Not used for other projection types.
Standard Latitude 2	30° for Lambert Not used for other projection types.
Number of Meshes	2
Grid Size	61x61
Grid Spacing	0.40° for Spherical 45 Kilometer for all other projections
Auto Centered	ON
Length of Forecast Start Time	00 Hours
Length of Forecast Stop Time	24 Hours
Data Assimilation Interval	12 Hours
Frequency of Sigma Output	1 Hour
Analysis of Mesh 1	True
Analysis of Inner Meshes	True
Nowcast Option	No
Output Parameters	Set to values in the default file.

- The **Mesh 1 Center Latitude** specifies the center latitude of the mesh 1.

  The **North/South** Button to the right of the entry box specifies the hemisphere of the center latitude.

  Mesh 1 Center Latitude is a *required* value.

  Keyboard Input is accepted by typing in a value for the center latitude.

  Mouse Input is accepted by clicking the left mouse button on the desired position of interest. The mouse feature will automatically update the center latitude and the center longitude.

- The **Mesh 1 Center Longitude** specifies the center longitude of the mesh 1.

  The **East/West** button to the left of the entry box specifies the hemisphere of the center longitude.

  Mesh 1 Center Longitude is a *required* value.

  Keyboard Input is accepted by typing in a value for the center longitude.

Mouse Input is accepted by clicking the left mouse button on the desired position of interest. The mouse feature will automatically update the center latitude and the center longitude.

- **Project Name** allows the user to specify a filename for the project.

- **Run COAMPS** allows the user to quickly save a project and begin batch model execution.

    - The user will be asked to verify a filename for the project prior to the project information being saved.

    - The project will be saved.

    - The user must setup the batch times for the model execution in the **Batch Panel**.

THE MAP PANEL

The interactive **Map Panel** allows the user to set up and modify the grid locations using the mouse. The interactive setup of the grids is encouraged to aid the user in setting up the project. The following features are available within the **Map Panel**:

- The **Latitude/Longitude** labels are located on the left side of the map display and display the current position of the mouse within the map image. The information is displayed as decimal degrees and degrees/minutes/seconds.

- **Zoom In** allows the user to zoom into an area. The user may zoom using either of two techniques:

    1. **Define an Area -** The user may select an area for zooming by pressing the left mouse button and dragging the mouse across the map to identify the rectangular are to be zoomed. The rectangular area is defined when the mouse button has been released. After an area has been selected, the user may click the **Zoom In** button. A new map with the selected area is returned in the **Map Panel**.

    2. **Center Zooming -** The user may zoom into the center latitude/longitude position of mesh 1 by clicking the **Zoom In** button after the center latitude/longitude position has been defined. A zoomed map is returned to the **Map Panel**.

- **Zoom Out** zooms out from the center latitude/longitude position.

- **Display Image** resets the image in the **Map Panel** to the global map. The user may select a global map centered at either 180° or 0° longitude.

- **Overlay** allows the user to define the data overlaid on the map images displayed in the interactive map display. The user may select to overlay topography, landuse, as

well as selecting no data overlay. Topography is the default and is recommended. The landuse images require additional time, compared to the topographical images, to create.

THE MAP PROJECTION LOCATION CONTROL PANEL

The **Map Projection Control Panel** allows the user to specify the map projection parameters, grid spacing, grid sizes, and grid positions used for a COAMPS forecast. The **TAB** key allows the user to move through the panel to all fields that require input.

Two methods of entering data are available in the **Map Projection Control Panel**: keyboard input and mouse input.

1. **Keyboard Input**:

   - All keyboard input is entered by clicking the left mouse button in the text field of interest and typing in the value.

   - A **RETURN** key in the text field will check all the values entered for validity.

   - A **RETURN** key will also update the graphic display immediately on values that directly affect the graphical display.

2. **Mouse Input**:

   - Left Mouse Button single click - Sets the center position of the coarse mesh in the world map

   - Left Mouse Button double click - Sets the center position of the coarse mesh in a zoomed into area of interest

   - Left Mouse Button resize - Allows the user to position the cursor over a specific mesh and resize the selected mesh. All checking is interactively completed to verify the new size, and all input fields are immediately updated. The user may resize a mesh from any side (top, bottom, left, or right) or by using a corner point.

   - Left Mouse Button reposition - Allows the user to position the cursor over a specific mesh and reposition/translate the selected mesh by dragging. All checking is interactively completed to verify the position, and all input fields are immediately updated.

Interactive checking by the COAMPS-OS GUI is implemented to warn users of all projection or grid constraints during any mouse event.

Map Projection Options

The following map projections are available for COAMPS:

- **Mercator**

  The Mercator projection is obtained by projecting outward from the center of the globe to draw the earth's surface onto a cylinder enclosing the globe. The axis of the cylinder is always parallel to the earth's axis. The cylinder may be tangent to the globe at the equator (0° latitude) or cut the globe at two latitudes equally spaced from the equator. The latitude where the cylinder intersects with the earth is referred to as a standard latitude. The Mercator projection is best for COAMPS domains located in the equatorial and tropical regions. The poleward extent of the coarse mesh should not exceed 40° latitude. Recommended values for the standard latitude are between 25°S and 25°N. A COAMPS domain using a Mercator projection may cross the equator.

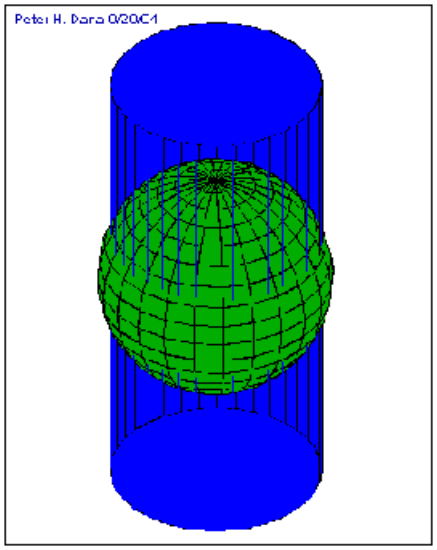


Figure 39. Mercator Projection

- **Lambert Conic Conformal**

  The Lambert Conic Conformal projection is obtained by projecting the earth's surface onto a cone that intersects the surface of the earth at two latitudes. The axis of the cone is always parallel to the earth's axis, and the apex is above one of the poles. The two latitudes where the cone intersects the earth are referred to as standard latitude 1 and standard latitude 2. The Lambert Conic Conformal projection is best suited for COAMPS domains located in mid-latitude regions. The poleward extent of the coarse mesh should not exceed 64° latitude, and the equatorward extent should be no less than 18° latitude. Recommended values for the standard latitudes are 30° and 60° latitude. Distortion is minimized in the region spanning the standard latitudes. **NOTE**: A COAMPS domain using a Lambert Conic Conformal projection may not

cross the equator; the Lambert Conic Conformal projection may be used in only one hemisphere.

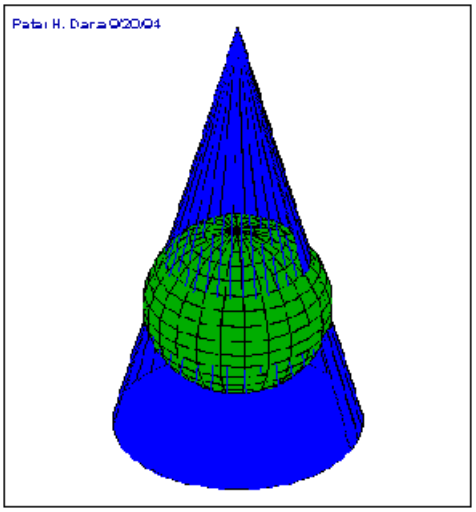


Figure 40. Lambert Conic Conformal Projection

- **Polar Stereographic**

  The Polar Stereographic projection is obtained by projecting the earth's surface onto a plane that intersects the surface of the earth at a single latitude. A line drawn normal to the plane is parallel to the earth's axis. The latitude where the plane intersects the earth is referred to as the standard latitude. The Polar Stereographic projection is best suited for COAMPS domains located in high-latitude regions. The equatorward extent should be no less than 60° latitude. Recommended values for the standard latitude are between 70° and 80° latitude. **NOTE**: A COAMPS domain using a Polar Stereographic projection may not cross the equator.

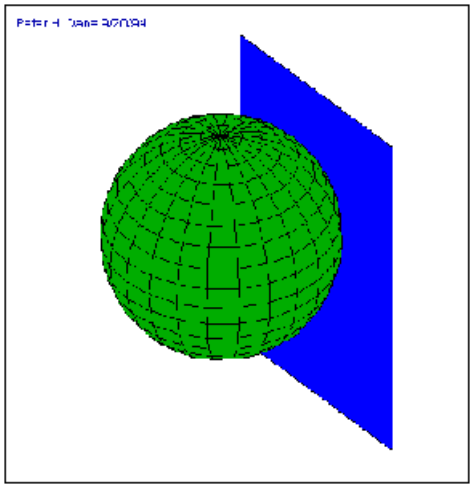


Figure 41. Polar Stereographic Projection

- **Spherical**

The Spherical projection uses the longitude/latitude lattice of the earth as an evenly spaced grid within a COAMPS domain. Distances between grid points are specified in degrees and converted to meters internally by COAMPS. No distortion exists for the Spherical projection. The location of the COAMPS model domain is unrestricted in the Spherical projection. **NOTE**: domains near the poles will require smaller time steps and will run slower.

Figure 42. Spherical Projection

- The **Mesh 1 Center Latitude** specifies the center latitude of the coarse mesh.

  The **North/South** Button to the right of the entry box specifies the hemisphere of the center latitude.

  Mesh 1 Center Latitude is a *required* value.

  Keyboard Input is accepted by typing in a value for the center latitude.

  Mouse Input is accepted by clicking the left mouse button on the desired position of interest. The mouse feature will automatically update the center latitude and the center longitude.

- The **Mesh 1 Center Longitude** specifies the center longitude of the coarse mesh

The **East/West** Button to the left of the entry box specifies the hemisphere of the center longitude.

Mesh 1 Center Longitude is a *required* value.

Keyboard Input is accepted by typing in the value for the center longitude.

Mouse Input is accepted for the value by clicking the left mouse button on the desired position of interest. The mouse feature will automatically update both the center latitude and the center longitude.

- **Standard Latitude 1** of a projection specifies the latitude (degrees) where the projection intersects with the earth.

  A value for **Standard Latitude 1** is *required for all projections except Spherical*.

  Standard latitude 1 *must* be entered via the keyboard.

- **Standard Latitude 2** of a projection specifies the latitude (degrees) where the projection intersects the earth. Only the Lambert Conic Conformal projection requires a standard latitude 2.

  A value for **Standard Latitude 2** is *required only for Lambert Conformal Projection*.

  Standard latitude 2 *must* be entered via the keyboard.

Basic Map Features

- **Load File** allows the user to read a **Map Projection File**.
- **Update Map** updates the **Map Panel**.
- **Reset** returns the control panel to the initial default or saved setting.

THE MAP PROJECTION POSITIONING CONTROL PANEL

The **Map Projection Positioning Control Panel** allows the user to modify the grids and the position of the grids.

The **TAB** key allows the user to move through the panel to all fields that require input from the user.

Grid Section Options

1. The **Number of Grid Points** defines the size of each mesh.

   Values for the number of grid points are required for each mesh that has been selected.

   Meshes may be chosen by selecting the **Mesh** button. Information fields that are grayed out are inaccessible due to the number of meshes selected.

   - Arrow keys may be used to increase/decrease the size for all the **Number of Grid Point Fields**.

     Users should press the arrow button indicating either to increment or decrement the gird size.

     Error messages are displayed if the minimum and maximum limits are reached.

   - Keyboard Input is acceptable for all the Number of Grid Point fields.

     Users should press **RETURN** after entering each new value. The **RETURN** key allows values to be checked for resolution constraints and parent constraints immediately.

     Error messages are displayed for all incorrect or unacceptable values.

   - Mouse Input is acceptable for all the Number of Grid Point Fields.

     A mesh must be visible in the **Map Panel**, and the left mouse button is used to resize the mesh.

     The values are interactively checked.

     Error messages are displayed to the **Status Log** during resizing, if any errors occur.

     Grid point values are updated during the resizing of the selected mesh.

2. **Grid Spacing** defines the X-Direction and Y-Direction spacing for the number of meshes selected.

   - Keyboard Input is the only way to enter the selected field.

     A **RETURN** key in the typed field will update all the **Grid Spacing** values.

     Values are in kilometers for all projections except Spherical, where the units are in degrees.

     Grid spacing values are limited to the number of meshes selected.

- The **Parent** feature allows the user to specify the parent of each mesh. The **Parent** feature permits two meshes of the same resolution to exist within a single parent mesh. By default, all meshes have a different parent mesh.

3. **Mesh Positioning** allows the user to automatically center the meshes within each other or offset the meshes.

   Users may toggle **Auto Center ON/OFF** for each mesh.

   If the **Auto Center Grids** is **OFF**, the user may offset the selected grid using one of the following methods:

   - Keyboard Input is accepted for the value by typing in the field.
   - Mouse Input is accepted for the values based upon the mesh selected.
   - Arrow Usage allows the user to incrementally move a mesh a single grid position. Arrow events immediately update the graphical display in the **Map Panel**.

Basic Features

- **Update Map** updates the graphical display with values in the **Advanced Control Panel**.
- **Load File** allows the user to read in a previously saved **Map Projection File** from a different project.
- **Reset** returns the control panel to the initial default setting.

THE FORECAST OPTIONS CONTROL PANEL

The **Forecast Options Control Panel** allows the user to specify the forecast parameters to be processed by the COAMPS Model.

The **TAB** key allows the user to move through the panel to all fields that require input from the user.

Forecast Specific Features

- The **Mesh 1 Ending TAU** specifies the length of the COAMPS forecast for mesh 1 only.
- The **Mesh 2 Ending TAU** specifies the length of the forecast specifically for mesh 2. The value must be less than or equal to the mesh 1 **Ending TAU**. The parent of mesh 2 is listed in the **Grid Section** table in the **Map Options Panel**.

- The **Mesh 3 Ending TAU** specifies the length of the forecast specifically for mesh 3 only. The value must be less than or equal to the mesh 2 **Ending TAU**. The parent of mesh 3 is listed in the **Grid Section** table in the **Map Options Panel**.

- The **Mesh 4 Ending TAU** specifies the length of the forecast specifically for mesh 4 only. The value must be less than or equal to the mesh 3 **Ending TAU**. The parent of mesh 4 is listed in the **Grid Section** table in the **Map Options Panel**.

- The **Mesh 5 Ending TAU** specifies the length of the forecast specifically for mesh 5 only. The value must be less than or equal to the mesh 4 **Ending TAU**. The parent of mesh 5 is listed in the **Grid Section** table in the **Map Options Panel**.

- The **Frequency of Sigma Output** specifies the frequency for writing out the COAMPS internal sigma-z fields during the forecast run thus identifying data to be saved in the TEDS database.

- The **Interval of Data Assimilation** specifies the frequency of the COAMPS data assimilation cycle. The **Interval of Data Assimilation** is the interval used for reading and writing of the input and output fields required for data assimilation. The interval should be equivalent to the frequency that the COAMPS forecasts are performed.

- The **Analysis of Coarse Mesh** is the flag for running Multi-Variate Optimum Interpolation (MVOI) analysis.

  TRUE – Perform MVOI; generate increments from the observational data and first-guess fields.

  FALSE – Do not perform MVOI; interpolate background fields to the COAMPS meshes.

- The **Analysis of Inner Mesh** is the flag for performing MVOI analysis for the inner meshes.

  TRUE – Perform MVOI on inner mesh fields.

  FALSE – Do not perform MVOI; interpolate coarse mesh increments to the inner mesh fields.

Forecast Basic Features

- **Load File** allows the user to read a previously saved forecast file from a different project.

- **Reset** returns the control panel to the initial default setting.

THE NOWCAST OPTIONS CONTROL PANEL

The **Nowcast Options Control Panel** allows a user to generate the Nowcast data fields associated with an executing COAMPS model run. The **Nowcast Control Panel** allows the user to select the option to execute the Nowcast and set the Nowcast time interval.

NOTE: Nowcasts will only be executed for projects running as a batch job. Please review the message displayed in the control panel in red for details and instructions regarding the presently selected project file.

The **TAB** key allows the user to move through the panel to all fields that require input.

Nowcast Specific Features

- The **Run Nowcast** menu specifies the option to execute a Nowcast (**Yes/No**).
- The **Start Time** and **End Time** specify the time range for executing the Nowcast.
- The **Interval** specifies the frequency for executing the Nowcast during a specified range.
- **How many minutes after real time should Nowcast start?** specifies the time Nowcast will begin. The delay allows time for the observational data to be transferred to the COAMPS server. The recommended value is 40 minutes.

Nowcast Basic Features

- **Load File OK** allows the user to read a Nowcast file.
- **Reset** returns the control panel to the initial default setting.

THE OUTPUT CONTROL PANEL

The **Output Control Panel** allows the user to select the output of a COAMPS forecast. The user may select any combination of parameters and times for each selected mesh. Four different combinations of selections per each output type, time, and mesh are allowed. Select any number of items per parameter type and mesh type.

The **TAB** key allows the user to move through the panel to all fields that require input.

Output Specific Features

- The **Output Parameters** selection button allows the user to select between **Pressure Level Parameters**, **Height Surface Parameters**, and **Surface Parameters**.

- The **Mesh Type** selection button allows the user to select the desired mesh number (1 through 5).

- The **Selection Number** allows the user to have four different combinations of parameters and times for each **Output Parameters** and **Mesh Type** selection.

- The **Start Time** indicates the time to begin the output of the selected parameters. The values are input as hours and minutes for each combination selection.

- The **Stop Time** indicates the time to terminate the output of the selected parameters. The values are input as hours and minutes for each combination selection.

- The **Time Interval** indicates the frequency of output for the selected parameters. The values are input as hours and minutes for each combination selection. The arrow buttons allow the user to increase or decrease the time interval by an amount consistent with the COAMPS timestep.

- The **Parameters** list box allows the user to select a set of parameters. Click on each parameter desired for output. The user may click a selected parameter again to deselect it.

- The **Levels** list box allows the user to select the level(s) of selected output parameters. Click on each level desired in the output to select the level. The user may click a selected parameter again to deselect it.

Basic Output Features

- **Load File** allows the user to read an output file.

- The **Default File** button allows the user to load a set of pre-selected output parameters.

- **Reset** returns the control panel to the initial default setting.

THE APPLICATION PREFERENCES CONTROL PANEL

The **Application Preferences Control Panel** allows the user to re-define all of the applicable directories required by COAMPS and COAMPS-OS applications. Two methods for modifying the selections are available: interactive and initialization.

The interactive method allows the user to specify directories in the **Application Preferences Control Panel** by typing in the directory or by selecting the directory from a file selection box.

- **Typing Method**: Type in the directory path in the text field. The path name specified *must* exist.

- **Selection Method**: The user provided with the present directory structure. The user may open the file selection box by selecting the directory specific button. Select a directory by with a single click on the chosen directory and select **OK**.

The initialization method allows the user to modify the default directory locations. The defaults are always loaded upon opening the COAMPS-OS GUI. The user may print and complete the information in Table 3-1 to use as a reference for the directory paths. A description of the directories is provided following Table 3-1.

Table 3-1 COAMPS-OS Relevant Directories

Directory for the COAMPS User Files and Model	
Diagnostic Output	
Work	
Model Executables	
Directory for the Input Data to COAMPS (Dynamic)	
Global Model Data	
Observational Fields for Data Assimilation	
Observational Fields-Ocean Data Assimilation	
Directory for the COAMPS Database (Static)	
Surface Climatology Directory	
High Resolution Topography Data	
Coastline Data	
High Resolution Albedo & Surface Roughness	
Climatology for Ocean Data Assimilation	
High Resolution Land Use Data	
GOES Satellite Radiance Data	

Description of Directories

Diagnostic Output
Root path to the COAMPS output files. The project name and "log" directory are appended to the value listed in the **Application Preferences** window.

Work
Root path to the COAMPS output files. The project name and "run" directory are appended to the value listed in the **Application Preferences** window.

Model Executables
Path to COAMPS_md_coamps_analysis.exe and COAMPS_md_coamps_forecast.exe executables.

Global Model Data
Path to the boundary condition files used by COAMPS.

Observational Fields for Data Assimilation
Path to the atmospheric observation files used by the COAMPS analysis.

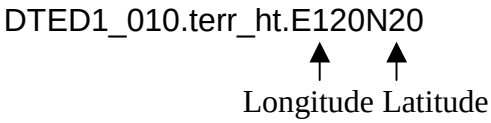
Observational Fields for Ocean Data Assimilation
Path to the oceanographic observation files used by the COAMPS analysis.

Surface Climatology Directory
Path to the surface climatology files used by COAMPS. The files in the surface climatology directory should include those listed in Table 3-2.

Table 3-2 Surface Climatology Directory Relevant Files

Filename	Contents
climgsst	Ground Temperature
climgwet	Ground Wetness
climland	Land/Sea Table
climsoil	Soil Temperature
climtdev	Standard Deviation of Terrain
climtopo	Topography
climtsst	Sea Surface Temperature
climz0z0	Surface Roughness

High Resolution Topography Data
Path to the 1-kilometer Digital Terrain Elevation Database (DTED) used by COAMPS. Terrain elevation data is stored in 20° longitude by 5° latitude tiles. Filenames indicate the longitude and latitude of the lower left corner of the tile. Missing tiles imply that all points in the 20° by 5° tile are zero elevation. An example file is shown below:



Coastline Data

Path to the 400-meter resolution inland water, open sea, land, and water databases. The files are used to determine the land/sea table used by COAMPS. Required files are listed in Table 3-3.

Table 3-3 Coastline Data Files

Filename	Contents
inld_wtr.400	Inland Water
lnd.400	Land/Sea Table
open_sea.400	Open Sea
wtr.400	Water

High-Resolution Albedo & Surface Roughness

Path to the high-resolution albedo and surface roughness fields. Required files are listed in Table 3-4.

Table 3-4 High-Resolution Albedo and Surface Roughness Files

Albedo Files	Ground Wetness Files
albedo_apr	z0_apr
albedo_aug	z0_aug
albedo_dec	z0_dec
albedo_feb	z0_feb
albedo_jan	z0_jan
albedo_jul	z0_jul
albedo_jun	z0_jun
albedo_mar	z0_mar
albedo_may	z0_may
albedo_nov	z0_nov
albedo_oct	z0_oct
albedo_sep	z0_sep

Climatology for Ocean Data Assimilation

Path to the ocean climatology files used by the COAMPS Ocean Data Assimilation (CODA) component of COAMPS. Required files are listed in Table 3-5.

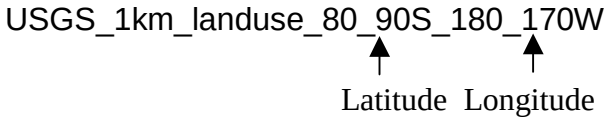
Table 3-5 Climatology Files

Filename	Contents
DBDB.nhem_topo	Northern Hemisphere 10' Digital Bathymetry Database
DBDB.shem_topo	Southern Hemisphere 10' Digital Bathymetry Database
ECMWF.ice_clim	ECMWF monthly 1° ice climatology

GDEM.ts_clim	GDEM 1° 30-level annual temperature and salinity climatology
MODAS.ssh_clim	Sea Surface Height climatology
MODAS.ssh_std	Sea Surface Height standard deviation
NCEP.sst_clim	NCEP monthly 1° Sea Surface Temperature climatology
SST.wm_bayes	Sea Surface Temperature

High Resolution Land Use Data

Path to the 1-km USGS landuse database. The landuse database is used to initialize the albedo, surface roughness, and ground wetness fields in COAMPS. Landuse is stored in 10° longitude x 10° latitude tiles. The filenames indicate the latitude and longitude range spanned by each 10°x10° file. Missing files imply that the land-use within the block is seawater. An example file is shown below:



THE RUN SETUP CONTROL PANEL

The **Run Setup Control Panel** allows the user to set up a COAMPS model run. The user may set up a run to begin at the present time or set up a batch job to be executed at a specific time every day.

Run Setup Specific Features

- The **Run Mode** selection button provides four options:

  1. Generate COAMPS Namelist Only
  2. Execute COAMPS Analysis
  3. Execute COAMPS Forecast
  4. Execute COAMPS Analysis & Forecast

- The **Selected Start Time** is selected from the list in the **COAMPS Start Time - NOGAPS Base Time** list. The list indicates the current available datetime groups for execution. The default start time is ***current-dtg***. The selection of the current date time group, ***current-dtg***, instructs COAMPS to use the latest available data. If the default start time is not the desired start time, a different **Start Time** must be selected from the available list.

- The **Selected Stop Time** is initially set to the **Selected Start Time**. Change the **Selected Stop Time** by pressing the **CTRL** key and at the same time selecting the stop time. The datetime groups between the **Selected Start Time** and **Selected Stop Time** will be highlighted in the list box, and the **Selected Stop Time** field will be set.

- The **Run COAMPS NOW** button will start COAMPS immediately with the selected **Run Mode**. All projects are run from the server, so only project information saved to the server is used by COAMPS. If the user is unsure if the latest information is saved on the server, the user should reread the project from the **Main Control Panel** and verify the information prior to execution. A message will be displayed indicating COAMPS has started successfully.

Basic Run Setup Control Panel Features

- **Reload Start Times** allows the user to obtain the latest list of COAMPS start times for the available datasets.

- **Reset** returns the control panel to the initial default setting.

THE BATCH SETUP CONTROL PANEL

The **Batch Setup Control Panel** allows the user to select a COAMPS project to be run as a batch job. The right-hand list box shows the currently scheduled batch jobs, and the left-hand list box shows the projects available for scheduling. Between the list boxes are three buttons:

- **Add to Batch Queue** - Begins the procedure to add the project selected in the left-hand list box to the batch job list in the right-hand list box. The **Add New Batch Job Control Panel** (next section) is opened. If the user clicks the **Add to Batch Queue** button with no project selected, an error message will appear.

- **Edit Batch Queue -** Opens the batch job highlighted in the left-hand list box for editing, so the user may change the batch times. If the user clicks the **Edit Batch Queue** button with no batch job selected, an error message will appear.

- **Remove from Batch Queue -** Deletes the batch job currently selected in the left-hand list box. If the user clicks the **Remove from Batch Queue** button with no batch job selected, an error message will appear.

THE ADD NEW BATCH JOB CONTROL PANEL

The **Add New Batch Job Control Panel** is used to set the start times for batch runs for the COAMPS model. The **Project will be started daily at:** information box at the top displays the current selections chosen. Users may schedule a batch job by setting the start time(s) desired using the **Start Time** counter and the **Hours** and **Minutes** selectors. The hours and minutes indicate the start time (Coordinated Universal Time <UTC> or Greenwich Mean Time <GMT>) of the COAMPS forecast. Remember to increment the **Start Time** counter for each new selection; otherwise, the time for **Start Time 1** will be overwritten with a new value.

The **Delete Time** button deletes a selected time from the batch time list. Set the counter to the time for deletion and depress the button. The number of times will be modified, and the change will be indicated in the information box at the top of the panel.

The **Clear Time** button will clear the current selected time from the list box only. No runtime has been added or deleted from the current selected list of run times.

The **Save Batch Job** button accepts the current selections and saves the batch runtimes to the COAMPS server. **Save Batch Job** will return the user to the **Batch Setup Panel**. The jobs saved should now appear in the **Current Jobs** list box. If the procedure executed properly, an information box will appear with the message “Job has been started”. A message will also be output in the **Status Log Panel** in the main map display.

The **No Change to current job – Return to Batch Panel** button closes the **Batch Edit/Add Panel** without changing the batch job status. The user is returned to the main **Batch Setup Panel**.

GLOSSARY

BUFR - Binary Universal Format

CMW - CONTEL Meteorological Workstation

COAMPS - Coupled Ocean/Atmosphere Mesoscale Prediction System

COAMPS-OS - Coupled Ocean/Atmosphere Mesoscale Prediction System - On-Scene

CODA - COAMPS Ocean Data Assimilation

COE - Common Operating Environment

DTG - Datetime Group; specifying the date and time of an analysis, a forecast, or Nowcast.

FNMOC - Fleet Numerical Meteorology and Oceanography Center

FTP - File Transfer Protocol

GRIB - Gridded Binary data format

GUI - Graphical User Interface

IP - Internet Protocol

Lambert Conic Conformal Projection - obtained by projecting the earth's surface onto a cone that intersects the surface of the earth at two latitudes (refer to page 48).

MDA - Meteorological Decision Aid

Mercator Projection - obtained by projecting outward from the center of the globe to draw the earth’s surface onto a cylinder enclosing the globe (refer to page 47).

METOC - Meteorology and Oceanography

MIDDS - Meteorological Integrated Data Display System

MIST - Meteorological Information Standard Terminal

MVOI - Multi-Variate Optimum Interpolation

NITES - Navy Integrated Tactical Environmental Subsystem

NOGAPS - Navy Operational Global Atmospheric Prediction System

Nowcast - In the mesoscale data assimilation scheme, the previous model forecast is used

as the starting point and observed data is incorporated in the analysis, which is then used to initialize the next model forecast. The process is typically repeated every 12 hours. When this cycle is used to regularly update only the local model forecast field using the analysis (without a subsequent forecast), this is called the COAMPS-OS Nowcast.

NRL - Naval Research Laboratory

Polar Stereographic Projection - obtained by projecting the earth's surface onto a cone that intersects the surface of the earth at two latitudes (refer to page 48).

Sperical Projection - uses the longitude/latitude lattice of the earth as an evenly spaced grid within a COAMPS domain (refer to page 48).

Standard Latitude 1 - the latitude (degrees) where the projection intersects with the earth (refer to page 49).

Standard Latitude 2 - the latitude (degrees) where the projection intersects the earth (refer to page 49).

TAU - The hour of a COAMPS forecast.

TDA - Tactical Decision Aids

TEDS - Tactical Environmental Data Server

UPS - Uninterrupted Power Supply

URL - Universal Resource Locator

WMO - World Meteorological Organization